Railway Age

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Effect of Long Runs on General Repair Costs

LOCOMOTIVE wear and tear are greater on long runs than on short runs, but experience indicates that the cost of general repairs per mile between shoppings, is, if anything, slightly less in long run service than for locomotives on relatively short runs. Concerning this subject an enginehouse foreman writes: "Of course it is a fact that there will be more work to do on a locomotive after it has made 350 miles than after it has made only 100 or 200 miles; but there is no serious effect on the locomotive. In fact, I am sure that the amount of boiler work is decreased, due mainly to the fires not being knocked so often, which we all know starts a boiler leaking to a certain extent, so the effect (stress due to expansion and contraction) on the boiler is not so great as it was prior to long run service. The upkeep of machinery is increased a trifle per locomotive handled at terminals where the engines are maintained, due to the increased mileage, but the decrease at intermediate points is sufficient to effect a saving in enginehouse expense and engines handled over the short run operation." The advantages of operating locomotives past intermediate terminals have been enumerated many times and are in general well known. It is of interest to have the testimony of this enginehouse foreman who is in daily contact with locomotives engaged in long runs that there is no serious effect on locomotive upkeep, or increase in the cost of general repairs for the same mileage between shopping periods.

Enginehouse Machine Equipment Essential

AS far as heavy repair output is concerned the locomotive back shop located near an enginehouse with little or no machine tool equipment labors under a serious handicap. The general foreman of a small back shop of this kind said recently, "Our greatest burden in securing adequate output is the necessity of taking care of all the machine work for the roundhouse. This amounts to 20 per cent of the total machine man-hours." At first thought, it may seem to make little difference in cost whether the machine work on a set of main rods, driving boxes, or valve motion parts is performed on tools located in the enginehouse, or on machines in the back shop. Careful study will indicate a real difference, however. Aside from the additional labor cost of transporting these heavy parts from enginehouse to back shop and return, valuable time is required for this movement during which the locomotive must be held out of service. Moreover the schedule of back shop work on heavy repair locomotives is seriously interfered with and the machine work itself cannot be organized on as efficient a basis. Concerning this latter feature the general foreman continued, "Our machines cannot be operated on a production basis; for example, we have a three-inch turret lathe, the tooling arrangement of which is often changed from one to seven times in a day, whereas this machine ought to be put on a certain class of work and placed on a production basis. The bulk of the enginehouse work brought to this shop must be given preference over all other work, thus causing a lot of lost motion." The machine shop is usually the limiting factor in locomotive back shop output, and often, after strenuous efforts have resulted in getting the machine work up to schedule, this work is placed hopelessly in arrears by the receipt of several sets of rods, driving boxes, etc., from the enginehouse which must be given preference. Money could be saved by equipping enginehouses with the machinery needed for this work.

Mechanical Men Discuss Engine Use

WHILE a number of committee reports presented before the recent Mechanical Division convention at Atlantic City were followed by more or less extended discussions, the report on Locomotive Utilization seemed to strike a particularly responsive chord in the hearts of many of the members present and they warmed up to the subject to such an extent that the discussion, even as abstracted, required more than seven pages of the *Railway Age* Daily edition of June 17. This discussion, along with the committee report, is worth re-reading and careful study. It furnishes convincing evidence that the members of the Mechanical division are fully aware of their responsibility for the intensive use of motive power and the great investment this power represents. A brief list of the men discussing the report, most of whom have made the steam locomotive a life study, is of interest. They took the floor in the following order: Samuel Vauclain, Baldwin Locomotive Works; W. H. Winterrowd, Lima Locomotive Works; A. I. Lipetz, American Locomotive Company; A. G. Pack, Interstate Commerce Commission; W. H. Flynn, New York Central; C. F. Giles, Louisville & Nashville; A. G. Trumbull, Erie; John Purcell, Atchison, Topeka & Santa Fe; George McCormick, Southern Pacific; C. E. Brooks, Canadian National; H. T. Bentley, Chicago & North Western; O. S. Jackson, Union Pacific; and C. A. Seley, Locomotive Firebox Company. Plainly, interest in locomotive utilization is not confined to any one section of the country. The locomotive builders are now producing machines capable of relatively far more intensive use than those built five years ago or even more recently, and further improvements are constantly being made. The railroads greatly need and must take full advantage of this increased potential serviceability of motive power. One important means to this end is to give a free hand during

the coming year to the Mechanical Division Committee on Locomotive Utilization in its search for information and actual facts bearing on locomotive use on individual roads.

Green and Gold Locomotives for the Southern

THE Southern, which has for years evinced a praiseworthy interest in the appearance of its locomotives, has taken a further step toward making them more pleasing to the eye. On Sunday it will place in service 23 new Pacifics, which will have tenders, cabs, wheels and all projections above the boiler jackets painted a rich Virginia green, striped with gold. The engines will appear in all the splendor which paint and polish can give to them. That this innovation will meet with an enthusiastic public reception cannot be doubted, for already favorable editorial comment is appearing in the daily papers. The New York World says of a railroad that "there is always a suggestion of the romantic, a reminder that the chief business in hand is the transportation of mankind to that ever-alluring region just beyond the horizon. To this general atmosphere gayly colored locomotives will add a festive touch." To capitalize on this "suggestion of the romantic" by accentuating it at the slight expense of a little extra paint and polishing must be good business—else so many roads would not be making the necessary outlay in money and labor. For the awakened interest on the part of the railroads in the attractiveness of their equipment—particularly that in passenger service—is assuming the proportions of a thorough-going revival. May the movement grew in vigor and proceed until the railroads can be truthfully said to have no peers among the various transportation agencies in the modernity of design, comfort and appearance of their facilities!

Education in Crossing Dangers

A LAW requiring automobiles to be stopped before crossing a railroad depends for its efficacy on the moral character of drivers; their appreciation of the dangers and their respect for law, as law, regardless of what they think about its fairness or wisdom; and also on their knowledge and skill to act in the right way after a duty has been pointed out to them. There may be at some times and some places substantial obedience to the spirit of a stop law without a full stop being made. All depends on the driver, because no police department can afford the men and money to watch all crossings, not even for one-tenth of the time. The rule to bring automobiles to a full stop cannot be made rigid and absolute, for such a rule would sometimes defeat the purpose of the legislation. That some education of drivers is possible, in spite of the impossibility of fitting a general statute exactly to the conditions, is shown by a recent count at a crossing in Georgia. The sign at this crossing calls for a full stop at all times. Of 211 cars checked, about one-half were Georgia cars and one-half came from other states. Of the Georgia cars 25 per cent stopped, but of the foreign cars only four per cent. Probably it is fair to assume that the purpose, or motive, or the mental attitude toward laws in general was the same in all of these drivers; and on that assumption we can decide that the small percentage of obedience among the drivers who presumably were not used to Georgia conditions was due to general dullness, ignorance, lack of capacity to think quickly or some other quirk not to be classed either as deliberate law-breaking or as recklessness. Is it reasonable therefore, to assume that the Georgia stop-signs are slowly educating the people of the state? And if so, how long before the percentage can be brought from 25 up to 50? To 75? The crossing problem will not stand still, however much we may protest that its solution is impossible. On Long Island (New York) recently some citizens called on the authorities to rule that at certain crossings, some or all of the time, the train (instead of the automobile) should stop before passing over. One crossing was said to have been blocked by trains 38 minutes out of 60, delaying hundreds of automobiles.

The Kind of Service Shippers Expect

AN important shipper recently loaded, on a Saturday afternoon, three cars of the commodity which he manufactures. These cars were destined for a point a bare hundred miles away but they had to be handled in two local trains—one on a branch line—each of which moved in but one direction each day. On Sunday the cars stood around in the yard at the initial terminal—no local trains at all being in operation. On Monday, likewise, they remained in the yard, since the local was operating in the opposite direction that day. On Tuesday they were moved to the branch line junction point, but the branch local had already departed. On Wednesday the branch line local was working in the opposite direction. On Thursday, finally, they were moved to their destination. Three cars of high grade freight covered 100 miles in five days. Fortunately, such an instance as the above is not typical. Railroad service is, generally, much better than that. However, with local trains operating in only one direction a day this was the best performance possible under the routine system. The factors which alter the system where necessary to give shippers the kind of service they insist upon are the superintendents of transportation, the division superintendents and their subordinates. The way that these officers, the train dispatchers, yardmasters and so on down the line, look upon business entrusted to them determines the reputation of the railroad with its customers. Is someone following each important railroad shipment giving it the kind of personal attention which a motor truck driver gives his lading? That is the kind of service which shippers are coming to expect and it is the kind of service which, in most cases, they are getting.

Better Spike Drivers Are Needed

IT takes longer to become a bricklayer or a plasterer than it does to become a good track spike driver. Nevertheless, spike driving is not learned in a day. Indeed, if one is to judge from the performance of some track men, there are those who never become proficient in this seemingly simple operation. In the old days on the track, spike driving was the test of proficiency as a track man. He took pride in his ability to drive a spike straight and true. Even the drone sought to acquire skill that he might not become the object of the scorn of his fellows. With increased refinements in track construction and maintenance and greater attention to measures designed to insure longevity of the component parts of the track, accurate spike driving deserves more

attention than ever before. The spike that has to be straightened several times because of glancing blows has lost much of its holding power with the result that it must soon be replaced and the tie will be punctured by a new spike hole long before this should become necessary. There is also good reason to believe that a chance blow of the spike maul on the rail base through the act of a bungling workman may lead eventually to a broken rail. Much of the work of the track man is arduous manual labor, requiring the exercise of little more than physical strength. However, it does embrace operations such as spike driving which call for skill and intelligence and unless the men have the necessary skill the work will be poorly or indifferently done. That the problem of recruiting for track workmen who are sufficiently ambitious to become skillful workmen has been difficult must be recognized. That track work has characteristics which will always make it less attractive than many other avenues of employment is also conceded. However, these facts cannot be offered in justification for a failure to adopt all reasonable measures to make the work as attractive as possible, and as security of employment is one of the prime elements of a desirable job, measures designed to decrease the seasonal characteristics of track work are a step in the right direction.

History Repeats Itself In Rate Regulation

THOSE who are familiar with the past history of railway regulation, and also with the testimony introduced in the western rate advance case, will find it extremely difficult, after reading the opinion of the Interstate Commerce Commission in that case, to be optimistic regarding the future of railway regulation.

History repeats itself, with some variations. The commission fifteen years ago decided adversely to the carriers the first proceedings brought by them for general advances in rates. The commission, then as now, was able to find many reasons for not advancing rates. Its decision then seemed plainly to be wrong and subsequent developments proved it was. The *Railway Age* said at that time, "It is a long step toward government ownership." It started a downward trend of net operating income which rapidly arrested railroad development. In five years the railroads and the business interests of the country dependent upon them for transportation were suffering acutely from traffic congestions and car shortages. In seven years government operation actually was adopted, mainly upon the ground that under private management the railroads had become unable to handle the country's commerce.

The Interstate Commerce Commission was principally responsible for the situation that led to government operation. It has done in the western rate case what it did in the rate advance case fifteen years ago. It has found excuses for not facing facts and giving effect to the law it is supposed to carry out. If this and other decisions made by the commission under the Transportation Act, indicate how it is going to administer that law, the nation will be fortunate if the commission does not within a few years inflict upon it transportation conditions such as to those that its regulation created in 1916 and thereafter.

Section 15-a of the Transportation Act requires the commission to so initiate and adjust rates that each large group of railways will be able to earn a fair average annual return. In the Hoch-Smith resolution Congress subsequently directed the commission to fix "the lowest possible lawful rates on products of agriculture, including livestock, compatible with the maintenance of adequate transportation service." The commission, in its opinion, admits that while this requires it to give special consideration to the condition of agriculture it does not alter its duty or authority under section 15-a. It recognizes the fact that on no rational basis of computation can the railways of the western group be held to have been earning a fair return. This means that, although the Transportation Act has been in effect for six years, the commission is forced to concede that it never has given effect to the most important provisions of the act by so fixing rates as to enable the western carriers to earn a fair return.

The disparity between the provisions of the Transportation Act, the commission's own rulings under it, and the results of its actual administration of the law are startling. On the basis of the commission's own tentative valuation western railways were entitled in 1921 to have earned a net operating income of $476,000,000. They actually earned less than $285,000,000, the shortage being $191,000,000. In spite of this, the commission in 1921 made a general reduction in rates. In consequence, although traffic has increased, the shortage under a fair return to western lines in 1922 was $140,000,000; in 1923, $87,000,000; in 1924, $103,000,000 and in 1925, $77,000,000, a total for the five years of $598,000,000. In the first five months of 1926 it was $44,000,000. Why did the commission find, after it had thus failed for six years to give effect in western territory to Section 15-a of the Transportation Act, that there is no warrant for it to begin now to give effect to it? It held that no "emergency" exists in western territory. But the law says nothing about "emergencies." It directs the commission to fix rates to produce certain results, not when financial emergencies demand it, but in order to avoid transportation emergencies.

The commission considered the efficiency of operation. It found it had been greatly increased and that there was no reason for holding that the western railways are not being efficiently and economically operated. It considered the claim that passenger traffic is not contributing its fair share to total earnings, and dismissed it. It found that upon the record there was not sufficient evidence to show that important changes should be made in divisions of freight rates between eastern and western railways. This left no source except increases in freight business or advances in freight rates from which additional revenues could be derived. The commission then closed the door to one source of revenue by saying that in renewing efforts to secure readjustment of rates "either for the purpose of improving earnings of carriers in the western trunk-line territory or for the purpose of rectifying inequalities in existing rate structures, carriers should propose no advances in rates on the products of agriculture, including livestock, except where particular rates on such products may need adjustment to remove inconsistencies or where it can be shown the product in question is not affected by depression."

This leaves the way open for the railways to try to increase their revenues, particularly in western trunk-line territory, by seeking "readjustments" of rates, but shows no advances will be allowed on any agricultural products that are affected by "depression." Apparently this indicates the commission will try to give effect to the Hoch-Smith resolution by largely ignoring railway property value and operating costs in fixing rates on farm products and basing them principally upon the prices of such products. But just when is a product

"depressed"? Does the commission mean that if farm products that are now "depressed" later advance in price the railways may feel free promptly to seek an advance in the freight rates on them? Does it mean that only farmers are to be favored with low freight rates on products that are "depressed," or that any and all producers whose products are depressed may with confidence ask the commission to adjust their rates accordingly and that the railways may with equal confidence seek advances in rates on commodities that are not depressed? Or is rate regulation to be, as in the past, a game of "heads I win, tails you lose," one in which rates will be regulated in accordance with prices when prices are low, but not regulated in accordance with prices when they are high?

This and other decisions the commission has rendered, together with developments that are occurring in connection with its valuation of railroads, show there has been exaggerated optimism among railway officers regarding the provisions of the Transportation Act and the way in which the commission, as at present constituted, may be expected to administer them. The rate advance cases decided in 1911 were started in a period of rising wages and prices. The index numbers of the Department of Labor show that in the five years ending with 1910, in which year the rate litigation of that period was begun, wholesale prices had advanced an average of 17 per cent and farm prices an average of 30 per cent. The commission then refused to consider these advances in prices as persuasive evidence. It held in effect that the schedules of rates of the railways should be allowed to charge should be measured by the net returns they were earning, and that the net returns were adequate. It is significant that Commissioner Prouty said in the opinion in the eastern rate case: "There is no testimony tending to show the cost of reproducing these properties. It is plain that physical valuation would introduce into the calculations a new element which might lead to a different conclusion."

In 1916 wholesale prices were 26 per cent higher than in 1910; and the average rate per ton-mile was the lowest in history. In 1917 wholesale prices averaged 76 per cent higher than in 1910, and prices of farm products 84 per cent higher, and the commission finally did grant the eastern lines a paltry advance in rates, but at the end of the year it made government control unavoidable by weakly throwing up its hands and sending a message to Congress saying that it could not advance rates enough to offset increasing costs of railway operation.

The rate making provisions of the Transportation Act were passed to give the commission not only the authority but the express legal duty to correct pre-war shortcomings in its regulation. Although in 1911 and subsequently until government control was adopted it had refused to consider advances in prices and increased prosperity of general business as reasons for advances in rates, and had used the net return the railways had been earning as almost the sole measure of the reasonableness of schedules of rates, in 1922, in disregard of the plain provisions of the Transportation Act, it so completely reversed its previous policy that, in spite of the inadequate net return the railways were earning, it made general reductions of freight rates, mainly because prices, and especially the prices of farm products, had declined. In 1911 it was advocating the valuation of railroads as a basis for the regulation of rates, and Commissioner Prouty, by his reference to "the cost of reproducing these properties," implied that the cost of reproduction would be a proper basis of valuation. The commission well knows that a valuation based upon present costs of reproduction would be, for the western lines, far greater than any rate base suggested in the western case. It now refuses, however, to give any recognition in regulating rates to the present cost of reproduction, and even refuses to fix rates that will enable the western railways to earn a fair return on its own tentative valuation, on the pretext that there is no "emergency," although its decision is simply in line with the policy it has been following since 1920. Since 1921, at the end of which year rates on farm products were reduced, the wholesale prices of farm products have increased an average of about 25 per cent. Having refused in 1922 to fix rates on its own basis of valuation because prices had declined, the commission now fails to find in this increase in farm prices any reason for advancing rates, although most farm prices are now relatively much higher than the freight rates of western railways. And all this occurs after the commission has declined to let the western railways get such additional revenues as they could by reducing their rates to the Pacific Coast to meet ocean competition.

The commission's decision disregards the views it held regarding railroad valuation when, before the great decline in the purchasing power of money, it believed valuation should be based largely on the cost of reproduction. It disregards the commission's own tentative valuation of the western railways and its findings that they were entitled to earn 5¾ per cent annually on it. It disregards its former position that freight rates should be based on the cost of furnishing transportation and not upon the prices of commodities and the conditions, prosperous or unprosperous, of the industries producing them.

One who labors through this maze of inconsistencies finds it impossible to discover any principles, legal or economic, by which the commission is guided in different cases and under different conditions in regulating rates. It is possible to find only one explanation of the policy followed by it, and this is that the commission is almost as zealous as Congress in striving to adjust rates in accordance with what it conceives to be the sentiment at the time of the communities, territories or classes that believe they will be the most affected by the rates it fixes. In 1911, public sentiment was plainly opposed to an advance in rates, and although it was warranted, as subsequent developments showed, it was denied. In 1917 there was less sentiment in eastern territory against advances, and small advances were granted. In 1920 most shippers joined with the railways in favoring large advances in rates, and they were granted. In 1921 and 1922 there was a strong sentiment in favor of reductions in rates, and they were granted, regardless of the provisions of the Transportation Act and of the effect on railroad net return. At present there is much complaint from western farmers regarding adverse conditions from which they are suffering. These conditions are not due to railway rates on farm products, because advances in rates in that territory have been less than the increases in prices of farm products and much less than the advances in prices of most commodities the farmers have to buy. But the commission excuses itself from granting western railways a small general advance in rates, on the ground that there is no "emergency," although these railways for six years have not earned, and are not now earning, anything approaching a "fair return" and the commission offers no definite suggestions as an alternative to the proposed general advance of freight rates.

There has been much said recently, apropos of the Pullman surcharge bill, the Gooding bill, and other similar measures, of the dangers of political rate making

by Congress. Those dangers are great, but they do not seem so great by comparison after one has read the commission's opinion in the western freight rate advance case. The Commission also can trim its sails according to the way the political wind is blowing, and disregard economic principles that it has solemnly laid down and even provisions of law which Congress has solemnly adopted for its guidance. If there is any other explanation of the commission's decision in the western rate case—if there is any economic justification for the position taken by it in that case—the student of economics will have to find it elsewhere than in the commission's opinion.

Corpulent Supply Balances

WE published last week an article showing the stocks of materials and supplies Class I roads had on hand at the close of 1925. In the last 10 years the railroads have been carrying stocks ranging in value considerably in excess of $500,000,000. In 1920 the figure was over $750,000,000. In the last two years reductions have been made to the extent of $150,000,000 —$122,000,000 in 1924 and $35,000,000 in 1925. Last year's reduction brings the value of the balances down to $525,000,000, which is the smallest since 1917.

What is the proper attitude for the railroads to take with reference to such figures? The problem is not simplified by the various viewpoints that must be considered. To the ultimate user the stock carried by a railroad is in the nature of a protection for his needs. It is to be expected, therefore, that the user of material, will regard the widespread reductions with concern. The star to which he hitches his wagon is safety first. In a measure, the valuation viewpoint is that too much emphasis easily can be placed upon "excess" stocks. A reasonable amount of stocks on hand is invested capital upon which a railroad is entitled to earn a fair return. To infer that stocks are high either by direct argument or indirectly by expressions of elation over reductions made is therefore apt to be held in disfavor insofar as it may cast a doubt upon the propriety of including them in valuation. Supply men naturally feel that heavy reductions in stock and promotional work toward further reductions adversely affect their sales, while railway supply officers themselves, suddenly recognizing their importance as a factor in public relations work and correspondingly sensing the possible effect of their own statements upon the public minds, are found to be toning down their allusions to excesses in stock balances. What the appropriate reception of the figures cited should be, therefore, is an important question, but it is not as difficult to reach the conclusions as it might seem.

The test is what in the long run promotes and fosters economy of railway operation. Material balances being carried from month to month by railroads in this country at the present time represent capital tied up to the extent of over $2,000 per mile of line operated. They exceed 11 per cent of the annual operating expenses of the roads and, in most months, exceed the revenues of that month. They represent, generally speaking, from one-quarter or one-third of the value of all materials purchased and used by the railroads in a year, and about $5 of capital held or tied up for every person in the United States.

It is a proper question, therefore, to keep uppermost, whether in operating economically the railways can justify the stocks carried. If any railroad can, that is all that is to be expected, but it is significant that with the reductions that have taken place the railroads are carrying less supplies today per ton of traffic handled than for some years and are operating with greater rather than with less efficiency. Under the circumstances, it seems proper to give consideration to the question whether the supplies carried cannot be still further reduced without interfering with, and with the effect of actually promoting efficiency and economy of operation.

The Rate Decision and the Wage Movement

THE decision of the Interstate Commerce Commission refusing to allow the western railways to make a general advance of five per cent in most of their freight rates has a direct bearing upon the movement for advances in wages which has been started by the leaders of the labor unions. A demand for an advance in wages may be based upon one or more of several grounds. It may be based upon the ground that the profits of an industry are so large that it can afford to pay higher wages and that its employees have contributed so much to its prosperity that they are entitled to be better paid. Another ground upon which it may be based is that the workers employed in the industry are receiving relatively smaller incomes than other classes of persons with whose incomes theirs can fairly be compared.

The carriers in eastern and southern territory have not in the period that the Transportation Act has been in effect earned on the average the "fair return" to which they are entitled, but they are now comparatively prosperous. The railways of western territory, and especially those in western trunk line territory and in the northwest, have been and still are, earning much less than a "fair return," and the Interstate Commerce Commission has declined to grant a small general advance in rates in order to improve their financial results. It would be in accordance with their usual strategy for the labor leaders first to press their demands upon the eastern and southern railways. The earnings the railways are making would not alone be used to support the claim for higher wages. It would also be supported by citations of wages being paid in other industries in the East and South, such as in the building trades. If, however, any advance were secured in the East and South, whether by negotiations or arbitration, the labor leaders would not stop there. They would immediately demand the same increases from all the western lines. They would claim, as in the past, that the ability of a particular railway, or even a group of railways, to pay is not the test of what it should pay, and that the employees of western railways should not be "penalized" as compared with those of eastern and southern railways because of their geographical location or the rate regulating policy of the Interstate Commerce Commission.

This raises a very interesting question. The labor leaders in their public utterances and through their journals have been deploring the economic conditions affecting the western farmers. Most of them have been in entire accord with the view finally adopted by the Interstate Commerce Commission that freight rates on farm products should not be advanced in western territory because of the depressed condition of agriculture. The labor leaders have been in happy unison with those who have believed that as long as the western farmers are suffering from depression western railways should suf-

fer with them from the same cause, and suffer still more. There leaders have been, and still are, gladly supporting Mr. Brookhart and other western candidates for office who would like to see the rates of western railways made lower.

Since agricultural conditions in the west have been successfully used as an argument against advances in freight rates, how can the employees of western railways, with any show of reason, continue their demand for advances in wages? First, it is now perfectly plain, if it was not so before, that a great majority of the western lines will not be able for a long time to afford to pay higher wages. Secondly, the present wages of railway employees are relatively much higher than the present incomes of western farmers, who are much the most numerous class in western territory. Have labor leaders any moral or economic ground for claiming that the earnings of western railways should be kept far below a fair return because western farmers are making inadequate incomes, and at the same time claiming there should be made advances in the wages of western railway employees that would greatly increase the existing disproportion between them and the incomes of western farmers?

Any advance in railway wages in western territory under present conditions would be disastrous. The Interstate Commerce Commission gave as one of its reasons for not granting the five per cent advance in rates that there does not exist any railway "emergency" in that territory. An advance in wages would speedily create an "emergency." If the labor leaders continue to maintain that the same railway wages should be paid throughout the United States the conclusion must be that no advances can reasonably be considered in any part of the country.

In dealing with the wage movement officers of railways in other territories should consider the plight of the western railways. The present disparity between the net operating income being earned by the various groups of railways cannot continue indefinitely. The eastern and southern lines, in dealing with both rates and wages, should fight side by side with the western lines against changes which will tend to reduce, and for changes which will tend to increase, the net operating income of the latter. The railroad problem is a national one, and in the long run it will be settled in such a way as either to make successful private management of all the railways impossible, or to make it possible for the railways in all territories to prosper under private management.

New Books

Movable Bridges. Vol 1, Superstructures. By Otis Ellis Hovey, Assistant Chief Engineer, American Bridge Company. 352 pages, 6 in. by 9 in. Illustrated. Bound in Cloth. Published by John Wiley & Sons, Inc., New York. Price $6.

Movable bridges represent a phase of bridge engineering which has experienced marked development in the last 20 years, but which has now reached a stage in which practices are rather thoroughly established. The time is therefore ripe for the publication of a record of the present state of the art in this field, and the author has performed a valuable service to the profession in providing a comprehensive text devoted exclusively to this one subject.

Movable bridges are of three general types, the swing, bascule and vertical lift, but whereas the swing bridge is a type of such long standing that all ordinary variations of design are common property, the other two types offer a wide variety of proprietary designs. Consequently various modifications of the swing bridge may be considered and compared on purely scientific considerations, whereas a critical comparison of the other types would lead into a highly controversial field. The author has therefore confined his treatment of the latter primarily to an outline of the fundamental principles followed by descriptions of particular structures.

A general treatment of the various types of structures is followed by chapters on designs and details which include such headings as Continuous Girders, Deformations of Beams and Girders, Details or Design, etc. Particular attention is given to end lifts, rail locks and pivot bearings and on the whole the material presented under these headings relates more specifically to swing bridges than to the other types of movable spans. This subdivision of space is predicated, in some measure at least, on the fact, as shown in the table on page 28, that 83 per cent in point of number and 86 per cent in point of total length of all movable railroad bridges built in the last 20 years by the leading fabricator are of the swing type.

The book contains an entertaining introductory chapter on the history of movable bridges and a chapter on general classification of types which outlines the principles that govern the selection of the type for a given combination of fixed conditions. Lists of structures giving principal dimensions, and tables of patent references also add to the value of the text.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Colombian Public Finance. Part I, by C. A. McQueen. U. S. Dept. of Commerce. Trade Information Bulletin No. 417. Railroads, p. 25, 32-38, includes data on lines already built, and those building or projected. 38 p. Pub. by Govt. Print. Off., Washington, D. C. 10 cents.

The New Democracy, by Woodrow Wilson. Presidential messages, addresses, and other papers, 1913-1917, edited by Ray Stannard Baker and Wm. E. Dodd. Especially "Panama Canal Tolls," p. 92-93; "Dissolution of New England Railroad Merger," p. 149-150; "Colorado Coal Strike," p. 168-169; "Railway Problems" (a letter to the late Frank Trumbull, dated Sept. 10, 1914), p. 172-173; "The Eight-hour Day" (on railroads), p. 264-266; "The Threatened Railroad Strike and the Eight-hour Day," p. 267-274. 2 Vols. Pub. by Harper & Bros., New York City.

Railroad Facts No. 4, by Western Railways' Committee on Public Relations. Outstanding facts on the present railway plant, and its improvement, railway service, rates, wages, earnings, operating records, in convenient form. 62 p. Pub. by the Committee, Chicago, Ill. *Apply.*

Periodical Articles

The Application of Engineering Methods of Analysis to Financial Investigations, by W. W. Colpitts. Address before McGill Chapter of Sigma Xi. Refers particularly to railroad investigations with that of the Chicago, Milwaukee & St. Paul as an example. Engineering Journal [Canada] July, 1926.

Apprenticeship—Its Status and Its Possibilities. Part III, by Dorothy Sells. This part describes apprentice systems in operation. Railroad systems described are those of the Santa Fe, New York Central, Grand Trunk of Canada, Southern Pacific, and the co-operative courses at the University of Cincinnati, pages 23-24. Industrial Management, July, 1926, p. 21-29.

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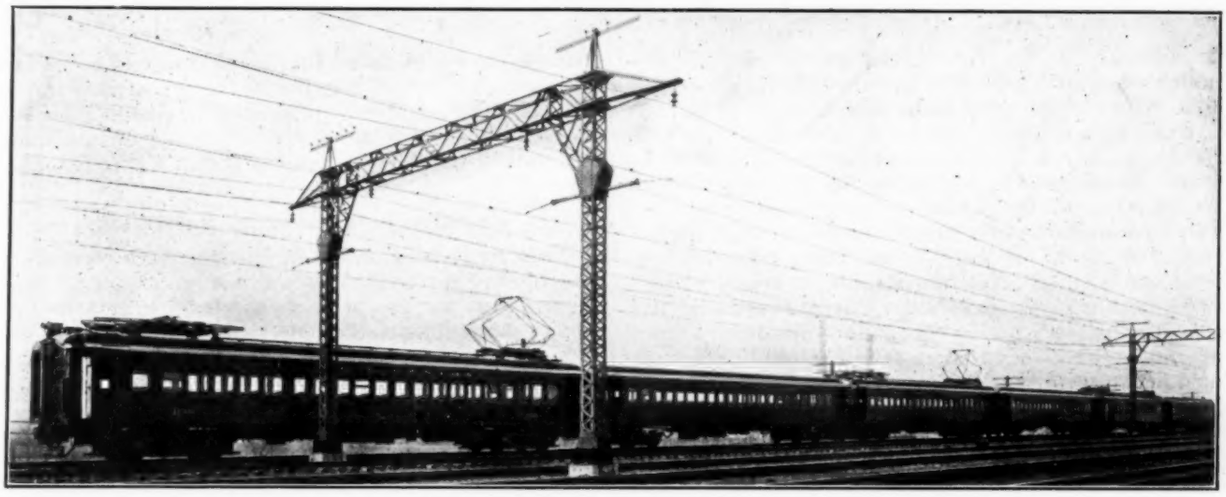
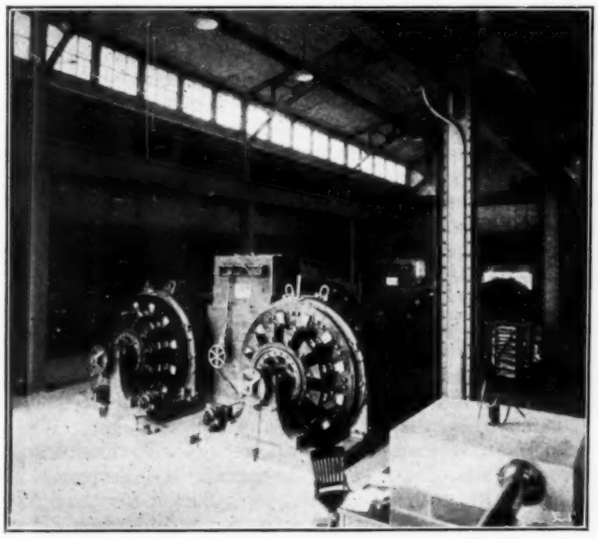


One of the Six-Car Trains in the Four-Track Territory North of Kensington (115th Street)

Electrification of I. C. Suburban Service Completed

Rapid construction progress made during the past year in spite of heavy terminal traffic

ON July 21, 1926, the first suburban trains were operated electrically on the Chicago terminal of the Illinois Central, marking the completion of the first stage of the electrification of both freight and passenger facilities within the city limits as provided for



Interior of the East 16th Street Substation, Showing Two 3,000-K. W. Synchronous Converter Units

by the Lake Front ordinance of July 21, 1919. The suburban service, all of which is now electrified, totals 106.2 track miles with schedules planned for the operation of 414 trains in a normal week day. Lengths of runs between scheduled stops vary from 0.34 miles in local service to 14 miles in "special" service, the average runs being 0.6 miles for locals, 0.95 mile for expresses and 1.7 miles for "specials."

For this service there will soon be available 260 multiple-unit cars consisting of 130 two-car units made up of a motor car and trailer semi-permanently connected together for operation at 1,500-volts d.c. through an overhead contact system. An appreciable saving of time is possible with the new equipment, as compared with steam operation. The straight line acceleration rate of the new units is 1.5 m.p.h. per sec. and their braking rate is 1.75 m.p.h. per sec. On level tangent track and with average voltage at the pantograph they have a balancing speed of 57 m.p.h.

The electrified track layout devoted exclusively to suburban traffic terminates on the north at the temporary station at Randolph street, there being two main tracks and two equipment leads south as far as Roosevelt road, a distance of 1.2 miles. Continuing south to 51st street, five miles, there are six main tracks, two each for "special," express and local suburban trains. The next eight miles of line south to Kensington (115th street) comprises four main tracks, two for "specials" and two for the joint use of express and local trains. A double-track main line continues south from Kensington to the southern terminus of the suburban system south of Matteson, Ill., a further distance of 13.8 miles. The South Chicago branch, a double-track line, 4.5 miles long, joins the main line through a "duck under" crossing at 67th street, while immediately south of Kensington the single-track Blue Island branch, 4.4 miles long, joins the main line. In addition to this total of 106.2 miles of electrified suburban main tracks there are 16.3 miles of electrified yard storage tracks with a capacity of 384 cars.

After an exhaustive study of four different systems of

electrification the decision was made to use a d.c. distributing voltage of 1,500, with a permissible variation from 1,400 volts to 1,550 volts under all conditions of load. A careful cost analysis led to the decision to purchase all the d.c. energy from the Commonwealth Edison Company. The problem of furnishing this d.c. power supply for operation of the suburban trains presented several features requiring study before a solution was reached. Service requirements were severe; heavy trains were to be moved at high accelerating rates, at relatively high speeds and with frequent stops. It was essential that reliability of service and economy be considered. Seven substations were found necessary. Automatically regulated field control synchronous converters were chosen to furnish the major portion of the traction supply, with mercury arc rectifiers in several of the substations to furnish the remaining portion. Under the present service demands there is one reserve or spare unit in each substation. It is planned to add additional units to maintain this safety reserve as service demands increase.

A. C. Supply to Substations and Switching Equipment

The a.c. supply to substations is 12,000 volts, 60-cycle, 3-phase, 3-wire, fed through underground cable to East 16th street, Brookdale, Cheltenham Front avenue and Laflin street substations, and 33,000 volts, 60-cycle, 3-phase, 3-wire, fed from overhead lines to Vollmer road and Harvey substations. All synchronous converter units are of General Electric Company's manufacture, being rated at 3,000 kw., 1,500 volts d.c. Each unit is composed of two 1,500-kw., 600 r.p.m., 750-volt, 60-cycle, shunt-wound synchronous converters connected in series. Each converter unit is designed for a load rating of 150 per cent for two hours, or 300 per cent for one minute, beginning with the machine at or below normal load temperature. These loads apply also to the transformer. The converter unit is designed to give a voltage on the direct current end of 1,525 volts at no load, to 1,425 volts at 300 per cent load when rated voltage is maintained at the high tension terminals of the converter transformer. This gives a 25-volt margin on either side of the railroad requirements for a distribution voltage of 1,400 to 1,550.

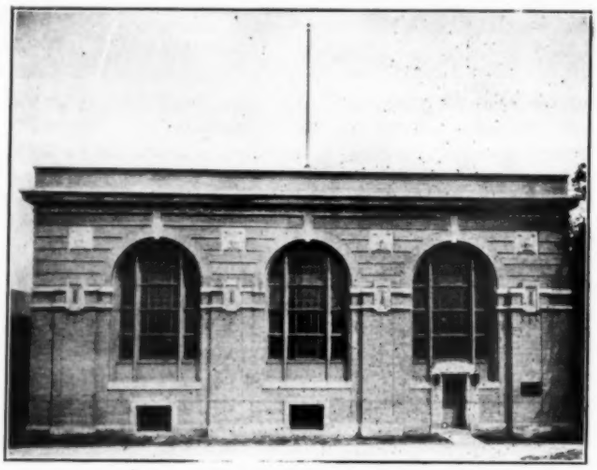
For voltage regulation there is provided in each substation a novel counter e.m.f. set, a four-circuit motor-operated rheostat and a Tirrill voltage regulator. This equipment is designed to control all converter sets in operation and to hold the d.c. voltage to definite values for any converter load up to 300 per cent rating, provided the rated voltage is maintained at the transformer primary. For primary voltages above or below normal, the d.c. voltage will be held at the proper values, providing the reactive kva. limits on the converters are not exceeded. While the regulator set appears complicated it really does nothing more than could an operator constantly standing at a manually operated field control converter watching the load fluctuations and continually adjusting the d.c. voltage. The regulator set which was specially developed for this service merely supplants the operator and does the "thinking" mechanically and automatically.

High Speed Air Circuit Breakers Used

Each converter group is provided with positive and negative high speed air circuit breakers on the d.c. side. The positive high speed breaker is designed to trip out on reverse current only. Suitable control switches and indicating lamps are provided for operation. An alarm circuit is provided so that in case of automatic tripping a lamp will be lighted and an audible alarm sounded. The negative high-speed breaker is designed to trip on overload and introduce a current limiting resistor in the circuit. Its control is somewhat more complicated than the positive breaker as provision is made for automatic reclosure if the fault is removed within a predetermined time.

Rectifier Equipment in Substations

The first installation of large mercury arc rectifiers in this country for converting alternating current to direct current for traction purposes is that included in four of the substations of the power company for furnishing part of the d.c. supply. Small rectifiers of this type have been used in electric railway service, but none approaching 3,000 kw. capacity as here installed. To Brown Boveri and two G. E. mercury arc rectifier units are employed. One Brown Boveri unit is used at the Brookdale substation and the other at the Harvey substation, both being rated at 3,000 kw. at 1,500 volts d.c. Each unit is composed of two 12-anode mercury arc rectifier bowls with one transformer per bowl. Each bowl is rated at 1,500 kw., 1,500 volts d.c. These rectifier units have load ratings somewhat similar to those of the converters; 150 per cent load for 20 min. and 300 per cent load momentarily. The d.c. voltage regulation is 1,550 volts at 5 per cent load, 1,500 volts at 100 per cent load and approximately 1,360 volts at 300 per cent load. At loads less than 1 per cent of full load, there is a steep voltage rise. The two General Electric rectifier units used, one at Laflin street and the other at Vollmer road substations, are both rated at 1,500 kw. at 1,500 volts d.c. Each unit is composed of two 6-anode mercury arc rectifier bowls with one common transformer per unit. Each bowl is rated at 750 kw., 1,500 volts d.c. These rectifiers have load ratings of 150 per cent load for 20 min., 200 per cent load for 5 min. and 300 per cent load momentarily. The d.c. voltage regulation for the Laflin street rectifier unit (which will have no automatic voltage regulating device) is from 1,550 volts at light load to 1,340 volts at 300 per cent load.



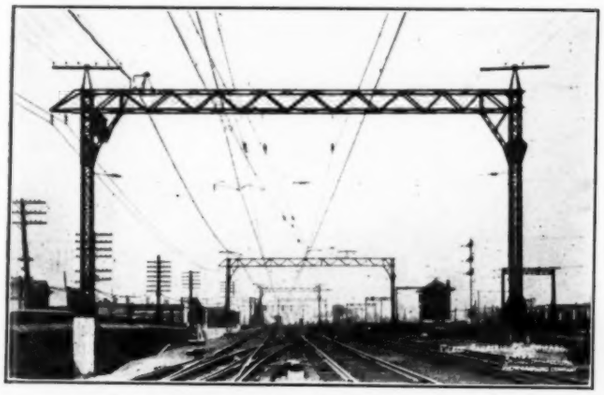
Exterior of Brookdale Substation Which Is Typical of the Architectural Treatment of All I. C. Substations

D. C. Feeder Equipment in Substations

All 1,500-volt d.c. switching (except Brown Boveri Company's rectifier control and converter negative breakers) is done through the medium of G.E. d.c. truck Type-Jr, high speed air circuit breakers. Feeder breakers are set to trip on forward shorts only, operating on rate of rise of current through the use of an inductive

shunt in parallel with the series trip coil of the breaker. They will open the circuit on short circuit in 0.010 sec. The positive machine breakers are set to trip on reverse current only, and embody in this setting the rate of rise high speed trip feature as just described. Supervisory control of all feeders is provided for, the G.E. selector supervisory equipment being installed. With this system either the railroad's power supervisor or the operator may open any feeder and either may lock open and prevent the closing of any feeder by the other party.

The d.c. meters at all substations except Front avenue are connected on the negative side of the traction supply.



Type of Catenary Construction Over Crossovers at Kensington Interlocking

One Sangamo d.c. shunt type mercury watt-hour meter is used per unit, its shunt being connected in the negative unit lead.

Overhead Distribution System

Due to the comprehensive electrification plan providing for the conversion of freight service north of Roosevelt road by 1930 and south of there by 1935, and possibly also through passenger service by 1940, depending upon the type of propulsion used by the roads in the future lake front terminal, the present suburban facilities have been designed with future requirements in mind. This is true particularly of the overhead catenary structures, which in many locations are at present uncompleted, but self-supporting, units of larger bridges that will ultimately span the entire width of the right of way. Because of the number of overhead railroad crossings, interlocking plans, multiple track junctions and special track layouts (except for moderate stretches of double-track line south of Kensington, 115th street) there is no continuous section over a mile in length where only standard catenary structures are used or where standard spacing and normal height of contact wires are maintained. All this rendered the construction work much more difficult than would be the case in any section of line outside of a busy terminal. Added to this was the inconvenience of carrying on the work under an extremely dense traffic, which in the section north of Roosevelt road made it advisable to do much of the electrical work including the rail bonding at night. From the 51st street interlocking north, much of the overhead work over certain tracks was done on Sundays. All construction work was subordinated to traffic requirements, no interference with train schedules being permitted.

A further incentive toward devising the most efficient construction methods and one which demanded the greatest co-operation from all the forces on the job, was the relatively high cost of labor due to local conditions. This was kept constantly in mind in designing new materials and in ordering materials, to reduce the field labor wherever possible. Special construction methods and tools were developed by the contractor to perform the work of stringing transmission and catenary wires, placing hangers and clipping in, on a production basis making the fullest use of work train equipment.

The vertical loads on the catenary foundations are comparatively light and for all permanent work concrete foundations of the gravity and side bearing types have been used. For the two-track or single-track bracket construction gravity foundations having a cross-track length of 12 ft., containing about 7½ cu. yd. of concrete are used where track centers permit without extensive track shoring. Where narrow track centers prevail, equivalent side bearing foundations have been installed with a bearing area of 65 sq. ft. All foundations are reinforced and set with the steel structure well above the ground level, using a 1:2:4 mixture for the cap and a 1:2½:5 mixture for the body of the foundation. Normally the top of the foundation is six inches above the top of the rail.

Catenary Structures of Latticed Angle Construction

Where there are four or more tracks, that is, between Randolph street and Kensington, the structures consist of built-up columns and trusses of latticed angle construction, spaced normally 300 ft. on tangent track. Except at signal locations, the structures as now installed serve only the suburban electrification. While these structures vary in certain respects they are built up of standard sections which have been adopted for all types. That is, the columns consist generally of four 4-in. by 4-in. angles, laced, with a depth across the track of 15, 16, or 18 in., while the trusses are built up from

The "Clipping In" Process Was Slower Than Stringing the Wires—With 14 to 16 Men Handling Clips it Was Possible to Complete About 8,000 ft. of Track a Day

four 3½-in. by 3½-in. angles, legs out, and laced inside with depths of 3, 4, 5 and 6 ft. depending upon the lengths of the spans. Differences in loading have been taken care of with the use of angles of different thicknesses. By flattening the ends of all lacing members and riveting them direct to the angles the use of intermediate plates has been eliminated and obstructions to the view reduced.

Single columns with light brackets are used in the double-track territory between Kensington, Ill., and Matteson and on the South Chicago branch, where tracks are spaced either 16 ft. or 17 ft. between centers. These consist of Bethlehem H-beams with fabricated bases for

taking the foundation bolts. The catenary brackets are of light angles with adjustable rod sag braces. Columns of similar design but with one bracket only are used on the single-track Blue Island branch.

With the exception of the territory between Homewood, Ill., and Matteson, where signal bridges were in service prior to the electrification, combined signal and catenary bridges are used at all signal locations. These are built with the inspection platforms on a level with the lower chord of the trusses in order, again, to minimize obstructions to the view.

Flexible Catenary System Uses Double Contact Wires and Auxiliary Messenger

With sub-stations located approximately six miles apart along the right-of-way, no auxiliary feeders are required for the 1,500-volt d.c. system. The catenary system is so designed that it provides the necessary current-carrying capacity without additional feeders. Over each main track the cautionary distribution system comprises a composite, copper and copper-clad steel, main messenger of high tensile strength, a hard drawn copper auxiliary messenger and two cadmium bronze or copper grooved contact wires. The main messenger is 0.81 in. in diameter, made up of seven high strength steel copper-clad wires surrounded by 12 hard drawn copper wires and was furnished by the Copperweld Steel Company.

In the heavy traffic section north of 69th street bronze hangers consisting of single-bolt clamps with 5/16 in. hard drawn copper hanger rods are spaced 20 ft. apart normally. Suspended from these is a 200,000 circular mil 19-strand hard drawn copper auxiliary messenger. Two No. 3/0 80 per cent conductivity cadmium bronze grooved contact wires are suspended from the auxiliary messenger by bronze clips spaced alternately every 10 ft. The bronze clips are fitted with T-head brass bolts and nuts, permitting complete shop assembly and avoiding the necessity of starting the nuts on the bolts in the field.

In the territory south of 69th street and on the two branch lines, the main messenger is the same size as in the territory north of there, but the auxiliary messenger is of 105,500 circular mils area, made up of 19 strands of hard drawn copper wire. Grooved contact wires are No. 4/0 hard drawn copper. The hanger and clip spacings are 15 ft. and 7½ ft. respectively. The copper equivalent of the catenary system as installed north of 69th street is 838,900 circular mils while south of there it is 898,700 circular mils as installed new. Throughout the life of the contact wire the average conductivity over each track will be approximately 790,000 circular mills copper equivalent.

The bronze hangers and clips, as well as other catenary fittings, were furnished by the Ohio Brass Company, while the No. 3/0 cadmium bronze contact wires and the No. 4/0 hard drawn copper contact wires were supplied by the American Brass Company which also furnished the ½-in. and ⅜-in. copper auxiliary messengers. The Bridgeport Brass Company supplied the ⅜-in bronze messenger wire used for yard track distribution.

The double-contact wire arrangement here used differs from what has been used previously in other installations, for instead of suspending both wires directly from the main messenger a stranded auxiliary messenger is used which increases the flexibility of the system. In addition, the individual contact wires are clipped alternately to this auxiliary messenger, resulting in a "soft" line. It is recognized that this comparatively elaborate system might be prohibitive for certain installations but the electrical conductivity is required and if sufficient capacity was not installed over each track additional feeders would be needed.

The main messenger is supported from the catenary structures by two 7-in. disk type Lapp suspension insulators having a minimum dry flash-over rating of 60,000 volts each. The messenger-supporting clamps are of bronze and are designed to permit the cable to slip at an unbalanced lateral stress of about 1,000 lb. They were furnished by the Ohio Brass Company. Owing to the large number of viaducts north of 43rd street, the normal height of the contact wires is 18 ft. 6 in. above the top of the rail, whereas south of 43rd street it is 22 ft. Underneath viaducts the minimum height of contact wires is 16 ft. 6 in.

Novel Construction Methods Employed for Stringing Overhead Wires

Several labor-saving ideas were developed by the contractor to expedite the construction of the overhead system. For the erection of the catenary main messenger which weighs 1½ lb. per ft., roller bearing suspension rollers were designed and attached to the bottom of the insulators in their permanent position. The bronze

Each End of a Motor Car Trailer Unit Is Equipped with an Automatic Coupler Containing 2 Air Lines and 39 Control Contacts

messenger clamps were wired immediately below the rollers, the insulators, rollers and clamps being hung from the structures at the same time. The messenger cable was run off of the reel car of the work train over a suitable pulley on top of the crane boom and was laid in the rollers at each structure as the work train passed under. With a reel car holding five miles of wire and with eight linemen and two groundmen it was possible to install from one to five miles of main messenger in a day. The average performance, however, due to traffic interference, was slightly over one and a half miles with sufficient time to sag the messenger permanently.

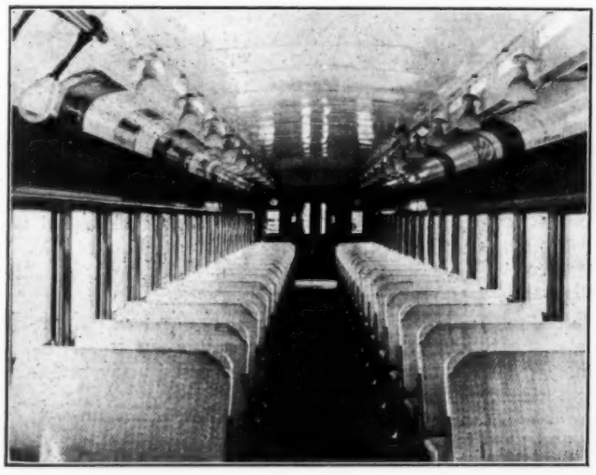
The next operation was the attachment of the hangers for the support of the auxiliary messenger which hangs level 1¼ in. above the contact wires. Since the spacing of the catenary structures could not be made uniform for reasons already explained, a graphical method of determining readily the proper length of hangers for spans of every length was devised.

To attach the hangers proper spacing was determined

by the use of a steel tape having predetermined spacings suitable for different lengths of spans marked on one side and dimensions to facilitate centering the tape between the structures on the reverse side. This tape was stretched between the structures along the side of the messenger cable and clamped to it by the men who installed the messenger clamps.

Contact Clips Were Spotted with an Elastic Gage

The auxiliary messenger and double contact wires were strung in one operation from a train consisting of an engine, reel car, tool car and tower car. Three-wheel rollers were designed to attach to the bottom of every



To Reduce Car Weights, the Inside Sheathing, Roof Sheets, Lower Deck Sheets and Doors Are of Aluminum or Aluminum Alloy

other hanger and the wires were placed in them as the train moved along the track. To obtain the proper spacing between contact wire clips, which is always half the distance between hangers irrespective of their spacing, and of necessity varying with the length of span, an ingenious application of an elastic ribbon was made. Two markers 7½ ft. apart and spaced symmetrically with respect to the center were attached to the elastic ribbon, thus marking, when the ribbon was stretched between hangers, the point of applying the clips without the need of making any measurements. This clipping-in process was the slowest work of all, but with a train with 14 to 16 men handling the clips, about 8,000 ft. of track was completed in a day.

While the main work was handled effectively by the methods just described the cutting in of insulation, the installation of cross-overs, pull-offs, steady attachments and special work of every character had to be done without the use of any special or novel equipment and the latter constituted a large share of the entire job. The stringing of wires was started in September, 1925; although the track work was not advanced to the point where continuous effective construction activities could be maintained until January, 1926. Practically all of the overhead catenary system was strung by the middle of June, after which eight work trains were occupied with special work such as installing pull-offs and making adjustments until July 20.

The overhead contact system has been sectionalized in order to minimize delays to traffic if trouble should occur. On the main line this is accomplished with air gaps, the double contact wire lending itself readily to this method. At these points the contact wires are raised alternately high enough to insert strain insulators in each without any danger of the insulators fouling a pantograph. Over slow speed cross-overs and turnouts wood stick section breaks are provided.

Gas Welded Bonding Used for Return System

The return system in certain places is reinforced by bonding additional tracks to those actually electrified. This has been done in the territory between 16th and 69th streets to get the required return conductivity. A single No. 4/0, 127-strand, soft drawn copper cable bond of the gas weld type, supplied by the Electric Raiiway Improvement Company, Cleveland, Ohio, is installed on each standard joint. The rail is 90 lb. A.R.A. Type-A with a special reinforced angle bar. The bond when straight measures 13½ in. over-all with 8½ in. between terminals and when applied is so formed that it is approximately 7 in. between the inside ends of the terminals. Two copper terminals are provided on the bond to service the cable and provide shoulders for welding. Actually the weld is made between the outside rail head and the ends of the individual copper strands, but it also includes the copper terminals. For turnouts, slip switches and movable point frongs, special bonds are installed made from 300,000 circular mil 127-strand soft drawn bare copper cable.

To obtain the benefit of the lower rate provided for in the comprehensive service agreement with the Commonwealth Edison Company, a miscellaneous light and power, and signal transmission system is installed. From Randolph street to 69th street, the light and power transmission system consists of duplicate 4,000/2,300-volt, 3-phase, 60-cycle, 4-wire lines. For the balance of the suburban zone, including the two branches, a single circuit of similar description is used. Both light and power transformers up to 15 kw. capacity are mounted directly on the catenary structures but where greater transformer capacity is needed separate housings are provided.

Labor Saving Methods Used in Stringing Line Wires

For the stringing of the transmission wires several labor saving devices were employed. A bank of nine roller-bearing grooved rollers, placed on a common shaft 6 in. apart and secured to a channel iron, was attached to the top cross-arm. Specially designed rollers were mounted on the top of the tool car and a cage-like device made up of vertical and horizontal pipe rollers were secured to the end of the crane boom. In this way the wires were spaced to conform to the fixed rollers and a maximum of eight wires were placed in the rollers with one movement of the train. With reels, each holding a mile of wire, and two reel cars, 16 wire-miles have been put in the rollers in a day and sagged temporarily.

Where a track external to the catenary structures was not available a patented pulling device designed by the contractor was employed which handled as many as six wires simultaneously. In this method the reel car was anchored and the wire attached to a spreader which was pulled over the rollers by means of a heavy rope that had been run over the center rollers.

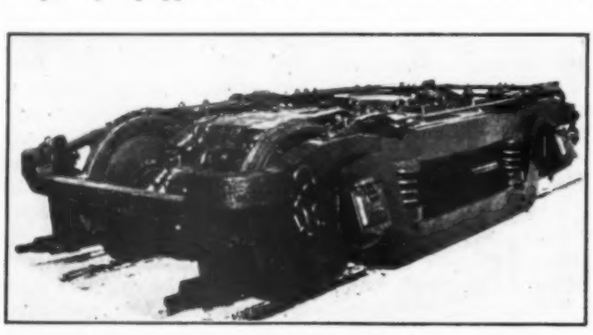
Motor Cars and Trailers Are Semi-Permanently Connected

It was recognized as necessary from an operating standpoint to have identical equipment for all classes of service which made it necessary that the motor car equipment selected be able to stand the maximum service without injurious overload. From this standpoint the local run to South Chicago was the determining

factor. With the 20 cars purchased in 1920 for steam operation and 25 additional cars obtained two years later, all of which are now being converted into trailer cars for electric operation, there will be available shortly for suburban service 130 two-car units. The trains are made up of motor car-trailer units semi-permanently connected with one control point in the motor car and one in the rear end of the trailer, each motor car being equipped with four d.c. motors.

This selection was based upon studies that were made of the economic value of various make-ups of trains, this particular arrangement possessing advantages in both first cost and annual charges as well as other advantages of an operating nature. The new equipment provides automatic acceleration as well as manual step by step operation, a new design of automatic, mechanical, electrical and pneumatic coupler, and electro-pneumatic brakes capable of applying the brakes simultaneously on all cars of the train. There is little difference in the bodies of the motor cars and trailers, except that the motor car underframe was designed to carry the control equipment and the roof framing was proportioned to carry two pantographs. While trap doors and steps were provided on the original 45 cars used in steam operation, they are omitted from the new motor cars and are installed only on the ends of trailer cars adjacent to the motor cars. Their provision is only for emergency use, as high platforms are installed at all of the suburban stations.

Each car of a motor car-trailer unit will seat 84 passengers, 68 in the cross seats and 16 in the four longitudinal end seats. The aisle width is 3 ft. ½ in. The cars are each 72 ft. 7½ in. long over the buffers and 10 ft. 6 in. wide over the platforms at the vestibule side doors. The body of the car is of copper-bearing steel, the inside sheathing of aluminum, the roof sheets and lower deck sheets of aluminum alloy and the doors, of which there are 11 in each car, are made of sheet aluminum. Without any passenger load the motor car weighs completely equipped 141,000 lb. and the trailer car 85,000 lbs. Collapsible safety gates are provided between the cars at the sides to prevent passengers on suburban platforms falling between cars. As an added convenience all car are equipped with diaphragms to permit easy access from car to car without exposure to the weather.



Trucks Are of the Swing Bolster Equalized Type, the Frames with Pedestals, Transoms and Brake Supporting Lugs Being Integral Steel Castings

The motor cars were built by the Pullman Car & Manufacturing Company, while the 85 new trailers were furnished by the Standard Steel Car Company. The latter company is also converting the 45 cars formerly used in steam operation for use as trailers.

The trucks, of the swing bolster equalized type with a wheelbase of 8 ft. 3 in., are equipped with two 750-volt motors each, the latter being insulated for 1.500 volts, as the two motors are permanently connected in series on each truck. On the basis of hourly rating these motors are 250 hp. and have a continuous current-carrying capacity of 210 amp. The General Electric Company and the Westinghouse Electric & Manufacturing Company each furnished 260 motors. The truck frames with pedestals, transoms and brake-supporting lugs are integral steel castings made by the Commonwealth Steel Company, Granite City, Ill. Rolled steel wheels 38 in. in diameter are used. Clasp brakes are used on both motor and trailer trucks. The trailer car trucks have a shorter wheelbase, 6 ft. 3 in., and are fitted with 33-in. wheels, but in other respects they are similar to the motor car trucks.

Safety First Features Incorporated in the Master Controller

The master controller has a safety-type handle which will open the main circuit and set the emergency brakes if released, except when the reverser handle is in the off position. As a further safety precaution it is interlocked with the brake apparatus in such a way that the power cannot be applied unless the brakes are cut in service from the cab. All control equipment is G.E-Type PC 103-D. Each motorman's control cab is provided with a door enclosing the equipment when the cab is not in use. When the door is open it forms the cab for the motorman. The space in the body bulkhead opposite the control apparatus contains a folding seat for the motorman.

The supporting structures for the two pantographs on each motor car are provided with double insulation. They have an operating range from 16 to 24 ft. and are spring-raised and air-lowered, all pantographs in a train being controlled, if desired, from a single cab. The pantographs were built by the R. D. Nuttall Company, Pittsburgh, Pa.

To provide 32-volt energy for control and accessory equipment a 3.5-kw. 1,600-volt G.E. motor-generator set is installed on the motor car. A storage battery is floated across this motor-generator set as a reserve source of energy. This unit has a double commutator and a common frame for both motor and generator. With the pantograph raised this unit runs continuously, delivering a floating charge to the 300-ampere-hour storage battery. An automatic Safety regulator of the carbon pile type regulates the voltage and load imposed by the control equipment connected to it, while separate carbon pile Safety regulators control the lighting circuit voltage in each car.

Each car is equipped with duplicate automatic Type-PS New York air brake equipment. At the same time that the electro-pneumatic brakes function the equipment also operates pneumatically. This permits the brakes to operate as standard automatic air brakes if the control voltage should fail for any reason without any additional attention from the motorman. While the normal service braking rate is 1.75 m.p.h. per sec. the cars can be braked in an emergency at a rate not less than 3 m.p.h. per sec. The normal brake pipe pressure is 90 lb. Each motor car is equipped with a G.E. 1,500-volt d.c. motor-driven air compressor having a piston displacement of 35 cu. ft. per min. and two 16-in. by 60-in. main reservoirs. Through a separate synchronizing train line circuit, operating at control voltage, all of the compressors in a train start when any governor cuts in, the latter having an operating range between 100 and 115 lb. per sq. in.

At each end of the motor car trailer unit there is an automatic self-centering Tomlinson coupler made by the

Ohio Brass Company, which completes the mechanical, pneumatic and electrical connections between the units. These are furnished with 6½-in. by 8-in. Harvey single spring friction draft gears and ball and socket anchorages. The draft gear is designed for a maximum curvature of 33 deg. The two-car unit may be coupled or uncoupled from an adjacent cab and can be operated also by hand from the ground. The automatic coupler contains the brake pipe and main reservoir balance pipe air lines and 39 contacts arranged in three rows with 13 contacts in each row for the low-voltage contral circuits. Between each car of a two-car unit there is a 1,500-volt bus for the heaters only and this is hand-controlled from under the car as the motor and trailer cars will not be separated except in the shop or for emergency purposes. However, the 1,500-volt circuits are not carried through the operating units of a train.

For heating purposes 1,500-volt, 750-watt units are provided, there being a total of 29 kw. per car. These heaters are equipped with two coils; normally one element under each of the 34 cross seats and all those underneath the longitudinal end seats may be energized. At low temperatures or when needed quickly to heat the cars, the additional coil under each cross seat may be used. Automatic control of heater circuits is provided by two thermostats of different temperature settings, subject to selection by the trainmen. The resistance units used in the heaters were supplied by the General Electric Company and the Edwin L. Wiegand Company, Pittsburgh, Pa.

The four vestibule side doors are operated by Consolidated 32-volt motor-operated door engines instead of the usual pneumatic type. The control stations for these are just outside the car end door and consist of a master switch which controls all four doors on one side of the two-car unit and a switch for the individual door adjacent to the station. The four doors can be controlled from any one of the four control switches.

Engineering and Construction Organization

All engineering work involved in connection with this electrification project was carried out under the general supervision of F. L. Thompson, vice-president, in charge of the Chicago terminal improvements of the Illinois Central and D. J. Brumley, chief engineer. W. M. Vandersluis, electrical engineer, had direct charge of the design and construction of all electrical features of the work, assisted by G. I. Wright, office engineer, A. H. Woollen, equipment engineer, and J. S. Thorp, distribution engineer. The mechanical department co-operated in the design of the equipment, the following members being represented on a joint committee responsible for the present design: R. W. Bell, general superintendent of motive power; J. H. Nash, superintendent of motive power; W. O. Moody, mechanical engineer; E. Von Bergen, air brake engineer; Lee Robinson, shop engineer; F. H. Case and E. W. Jansen, electrical engineers. The following members of the Chicago Terminal Improvement department were members also of this joint car committee: W. M. Vandersluis, electrical engineer; A. H. Woollen, equipment engineer, and W. T. Kelly, mechanical engineer.

The foundations were installed under contract by the Underground Construction Company with M. D. Thompson, assistant engineer of the railroad in charge. The catenary structures were completed by the railroad company's forces, under F. O. Draper, supervisor of bridges. Erection of all overhead wires for traction, miscellaneous power and light and signal systems, and all rail bonding was done under contract either on a fixed price or unit basis by the Pierce Electric Company, Chicago, with S. N. Tideman in general charge of construction, assisted by Floyd Knott, general construction foreman and J. S. Farrell, field engineer. All substation design and construction was carried out by the Commonwealth Edison Company.

Santa Fe Train Control Approved

WASHINGTON, D. C.

THE Interstate Commerce Commission on July 19 made public the order by Division 1 approving with certain exceptions the installation of the Union Switch & Signal Company's automatic train control system on the Atchison, Topeka & Santa Fe.

The device under consideration is an automatic train control system (three speed) of the continuous induction type. The installation inspected and tested was completed on January 1, 1925. It extends from East Fort Madison, Ill., to Chillicothe, a distance of approximately 102.17 miles of which 101.8 miles is double track. and .37 miles single track. There are 87 locomotives equipped with the device.

The cost of this installation, as reported by the carrier, covering wayside and locomotive equipment is as follows:

"Installing roadway equipment, pole line, etc.	$687,299
Incidental renewals or operation	25,233
Remodeling interlockings for train control	37,950
Remodeling crossing bells for train control	20,429
Equipping 87 engines with train control apparatus	305,371
Installing test equipment for engines	14,611
Total	$1,090,893

NOTE—The above figures include labor, materials, work train wages and supplies, rental and repair of equipment, transportation of material and equipment, and interest during construction on all items where applicable. The cost of equipping the 87 engines will also apply on the second order, Corwith, Ill., to Chillicothe, which we are now installing as this is the total number of engines to be equipped for the two territories."

As a result of this inspection and test, it is found that the installation meets the requirements of the specifications and order in *Automatic Train-Control Devices, supra,* except as noted below, and therefore, it is approved, except as hereinafter indicated:

All locomotives must be provided with pressure-maintaining valves.

The Atchison, Topeka & Santa Fe is expected to comply with the following requirements as to maintenance, tests, inspection, etc.

1. Instructions, reports and records in effect at the time of inspection relative to tests of locomotives and roadside apparatus should be consistently observed and continued; all reports to be made on forms provided for that purpose and regularly forwarded by the inspectors to a designated officer.

2. The automatic cut-in feature as installed is designed and operated on the open-circuit principle, and while the cab indication is intended to apprise the engineman of a failure of the device to cut in automatically, it involves reliance upon the human element, and where necessary to depend upon it, should be supplemented by such additional check as may be practicable. The plan in effect on this installation appears to be reasonably adequate and should be continued.

3. Such pneumatic portions of this device as contain functional parts essential to brake application, and are located outside of the cab, must be protected adequately against freezing, since if those valves should be sealed closed in normal position the results might be serious. While the results obtained with the protection now applied appear to have been satisfactory so far, it is not felt that the experience obtained has been extensive enough to be conclusive, and the matter should continue to have close attention.

4. It is suggested that consideration be given to the question whether an additional factor of safety might not be obtained at main track cross-overs in non-interlocked territory, if some arrangement were employed whereby both main tracks will be shunted so long as the cross-over is occupied.

The Atchison, Topeka & Santa Fe is expected to promptly and currently inform us as to the progress made in conforming to all of the above stated requirements and recommendations.

Western Rate Advance Denied

I. C. C. finds that western rate situation needs more specific treatment

WASHINGTON, D. C.

HOLDING that as to the major portion of the western district no financial emergency exists to justify a general advance in freight rates, that conditions in the northern region and in western trunk line territory as well as in the western district as a whole have recently shown an improving tendency, and that the carriers had not initiated suitable changes in rates to correct improper rate relations or to supply revenue deficiencies, the Interstate Commerce Commission has refused the rate increases sought by the western railroads. By unanimous decision dated July 14, but not made public until two days later, the commission denied their application for a general 5 per cent advance and also the request of security holders of the northwestern roads for a 15 per cent horizontal increase in freight rates in western trunk line territory.

At the same time the commission declined to grant the request of counsel for the farm interests that rates on agricultural products be reduced to substantially what they were on July 24, 1918, just prior to the general advance made by the Railroad Administration, stating that the earnings of the western carriers as a whole have not been such as to warrant it on the record as it stands in making any downward revision of rates on products of agriculture "or of other industries subject to depression."

The report gives the commission's interpretation of the Hoch-Smith resolution, holding that it has not repealed section 15a, but states that the record before the commission so far affords no adequate basis on which to make reductions or increases, and that the record will be held open for further consideration in connection with its rate structure investigation, No. 17000, and related proceedings.

The proposal of the western roads for an upward revision of class rates in western trunk line territory is still pending, having been submitted after the hearings on the 5 per cent application were under way, and the commission apparently invites the roads to submit concrete proposals as to changes in individual rates both for the purpose of correcting inequalities and for the purpose of improving earnings. It says, however, that the record warrants it in concluding that in proposing changes in existing rate structures, for either purpose, the carriers should propose no advances in the rates on products of agriculture, including livestock, except where particular rates on such products may need adjustment to remove inconsistencies, or where it can be shown that the product in question is not affected by depression.

After reviewing the evidence produced in the case as to the condition of the agricultural industry the report says: "It is plain from the record that there has been a substantial recovery from the postwar depression, but we find that the effects thereof are still in evidence."

The evidence relating to the controversial question of the value of the roads is also reviewed, but the commission says that in view of its conclusions it is not necessary in this case to enter into this matter nor to substitute a new basis of value for that heretofore recognized. In considering the rate adjustments which the carriers have proposed and may propose for the western district, it says, "it may become necessary to test further the rate base used in Ex parte 74."

The full text of the commission's conclusions follows:

The Commission's Conclusions

As to *Ex Parte* 87, it is quite clear from the evidence that so far as the major portion on the western district is concerned no financial emergency exists. In this portion the carriers appear to be both financially and physically sound. In the northwestern region and in western trunk-line territory the revenues of certain of the important carriers have not yielded 5.75 per cent upon any rate bases that can reasonably be adotped in advance of a final determination of present values for rate-making purposes. The least favorable conditions in the district, so far as carrier revenues are concerned, appear to exist in western trunk-line territory. It is, however, to be noted that both in the northwestern region and in western trunkline territory, as well as in the western district as a whole, conditions have recently shown an improving tendency.

Carriers in the western district requested a 5 per cent horizontal increase in freight rates, subject to certain exceptions. Security holders of northwestern carriers requested in addition a 15 per cent horizontal increase in freight rates in western trunk-line territory. Both requests were based upon the assumption of an existing financial emergency. It is evident that no such emergency exists in the western district as a whole. Furthermore, having regard to what has been already said as to the terms of the resolution, concerning the inequalities and discriminations in existing freight rate structures, we can not find on this record that such an emergency exists in western trunk-line territory as would warrant us in prescribing a general percentage increase in freight rates in that territory. As we have already stated, while we have power to prescribe such changes, we can properly prescribe them only upon clear evidence of urgent necessity. No such evidence is at present before us. The petitions of the carriers in western district and of the security holders with reference to western trunk-line territory will therefore be denied.

It is clear upon the record that there are many inequalities in the rate structures existing in portions of the western district which should be corrected. The provision in section 15a directing us to initiate, modify, establish, or adjust rates so that carriers may earn a fair return, does not relieve the carrier from the primary duty of initiating rates. That function belongs to management and not to regulation. It is the right and the duty of the carriers to take the steps necessary to correct improper rate relations as they may be found to exist, and to supply revenue deficiencies by initiating suitable changes in rates. The first definite proposal of the carriers in this proceeding was presented after the hearings began and was for a general 5 per cent increase on freight with certain exceptions. Later they submitted a proposal for an upward revision of class rates in western trunk-line territory, which has not yet been heard. Not only did the carriers fail to present evidence with respect to the need for changes in individual rates between particular points or on particular classes of traffic, but no state commission, shipper, security holder, or other representative of the public, or of particular interests who appeared, offered any feasible suggestions of this character. Even had we desired to assume the responsibility of prescribing individual rate changes with the object either of improving the earnings of carriers in the northwest, or of rectifying internal relations in the rate structures, the present record would not enable us to do so to any considerable extent.

Referring to *No.* 17000, as previously noted, our announcements issued prior to the hearings in these proceedings called upon the carriers and the public to furnish information with respect to what products of agriculture, including livestock, are affected by depression; what if any reductions may lawfully be affected in the rates of charges on products of agriculture, including livestock; and whether any rates, fares, or charges, either on particular classes and kinds of commodities or classes of traffic, in particular sections or between particular localities in the western district, or otherwise, may lawfully be authorized or required to be increased, and if so to what extent in order to compensate for such rate reductions, if any, as may be found proper on products of agriculture or livestock.

Notwithstanding the numerous hearings throughout the West,

at which all parties interested were afforded full opportunity of presenting evidence which they considered pertinent either to the questions asked or otherwise to the proceedings, very little was presented with respect to the rate structure affecting products of agriculture which would enable us to readjust the rates on these commodities, or reach a determination as to what, in the light of the resolution, would constitute reasonable and properly related rates in the different sections of the western district. Full information as to what the rates now are, and what would constitute reasonable rates, is necessary before action may be taken prescribing reasonable and nonprejudicial rates, in view of the terms of the resolution requiring us so to readjust rates as to bring about fair relations between particular sections, competing points, and traffic.

The record, however, warrants us in concluding that in proposing changes in existing rate structures, either for the purpose of improving earnings of carriers in western trunk-line territory, or for the purpose of rectifying inequalities in existing rate structures, carriers should propose no advances in the rates on products of agriculture, including livestock, except where particular rates on such products may need adjustment to remove inconsistencies, or where it can be shown that the product in question is not affected by depression. The terms "products of agriculture" and "livestock" we understand to mean such products and animals as are customarily produced for profit by farmers and ranchmen individually or cooperatively. The earnings of carriers in the western district, as a whole, have not been such as to warrant us on the record as it stands today in making any general downward revision of rates on products of agriculture, or of other industries subject to depression. The record does, however, present much information which bears directly on the task imposed upon us by the resolution, and it is our purpose to attempt to obtain further information necessary to enable us to determine what, if any, readjustments should be made as between commodities or in furtherance of the rectification of the rate structure as between particular points and districts. Our conclusions are without prejudice to the determination of the issues in *No.* 17000 and *No.* 15686 upon the consolidated record.

Class Rate Revision Case Still to Be Heard

The report states that the members of the committee of state commissioners who sat with the federal commission during the argument in this case have approved it.

The commission says that 5 per cent of the freight revenue, intrastate and interstate, of the Class I carriers in the western district for 1924 amounts to approximately $80,000,000, and that the proposed revision of class rates in western trunk line territory, if permitted to become effective, would increase the revenues by $11,528,924 annually, according to the estimate of the carriers. That supplemental petition will be heard, and disposed of separately. Respondents are negotiating with shippers in the territory with a view to possible agreement upon a mutually satisfactory basis of rates and both shippers and carriers have indicated to the commission that they do not desire hearing before fall.

The Potter Plan Not Discussed

With reference to the Potter pooling plan the report says that no party to the proceedings pressed its adoption and that in view of the conclusions reached there appears to be no occasion at this time to discuss it further.

Regarding the motions to dismiss the petitions, presented by counsel for the state commissions on the ground of the provisions of the Hoch-Smith resolution, the report says:

Motions to Dismiss

Following the presentation of the carriers' evidence on direct, counsel for the various State commissions and other State interests presented a motion to dismiss the petition in *Ex Parte* 87. A somewhat similar motion was later filed by counsel for the farm interests in so far as the petitions seek authority to increase rates on agricultural products, including livestock. The first of these motions is based on two general grounds: (1) That the evidence adduced in support of the petitions does not establish that the carriers are entitled to the relief sought, and (2) that, under existing conditions, the Hoch-Smith Resolution in effect debars us from granting the carriers a general increase in rates pending the completion of the investigation which we have instituted under that resolution.

The grounds upon which the second motion is founded may be summarized as follows: (1) That the resolution had the effect of repealing those portions of section 15a of the interstate commerce act on which the carriers' petitions are based[1]; (2) that the resolution constitutes a legislative finding by Congress of the existence of a depression in the agricultural and livestock industries, which finding is binding upon us until we report the results of our investigation under the resolution; and (3) that the rates on agricultural products, including livestock, in effect at the time of the approval of the resolution, became in effect the legislative maximum rates on those commodities which may not be increased except upon a finding by us or by the courts that the existing rates are confiscatory.

The sufficiency of the evidence to support the petitions of the carriers will be considered later. As to the second of the contentions made by counsel for the State interests in support of their motion, we are of the view that we are not debarred by the resolution from affording the carriers relief through the medium of a general increase in rates prior to the completion of the investigation under that resolution, if need for such action arises upon a clear showing of necessity. Both section 15a and the resolution must be given a construction which makes them practicable and workable. See *New England Divisions Case,* 261 U. S. 184, 197.

Hoch-Smith Resolution Does Not Repeal Section 15a

With the contention that the resolution repeals section 15a we are not in accord. The resoultion has the force and effect of an act of Congress. In it there is no specific repeal of any provision of existing law, and there is no reason for holding that the resolution by implication repealed or suspended the provisions of section 15a.

The resolution clearly points out that in making any change in accordance with its provisions, we shall give due regard "to the maintenance of an adequate system of transportation," and that the fixation of the "lowest possible lawful rates on products of agriculture, including livestock," shall be "compatible with the maintenance of adequate transportation service." These are expressions somewhat similar to those used by the Supreme Court in decisions rendered prior to the adoption of the resolution, specifically referring to the provisions of section 15a wherein Congress indicated that in determining what would be a fair return consideration should be given, among other things, to the transportation needs of the country and the necessity of enlarging such facilities in order to provide the people with adequate transportation. See *Wisconsin R. R. Commission* v. *C. B. & Q. R. R. Co.,* 257 *U. S.* 563, 585, decided February 27, 1922; *New England Division Case, supra,* page 190, *February* 19, 1923; *Dayton-Goose Creek Ry.* v *U. S.* 263 *U. S.* 456, 478, January 7, 1924. Congress could not have intended to repeal or suspend by indirection so important a provision of law as section 15a.

As before indicated, it is contended that the resolution constitutes a legislative finding that a depression exists in agriculture, which raises an indisputable presumption in all investigations held under its provisions or commenced subsequent thereto that such depression in the agricultural industry does in fact exist, and that such presumption will remain until we report the results of our investigation held under the direction and authority of that resolution, or until Congress repeals it, thereby precluding any action under paragraph (2) of section 15a. The resolution in its first paragraph makes the basic declaration that in adjusting rates we shall consider the conditions which *at any given time* prevail in the several industries, to the end that commodities may freely move. This declaration is inconsistent with the construction that a depressed condition in agriculture must be conclusively presumed to continue until Congress again speaks. The last paragraph, "in view of the *existing* depression in agriculture," directs that with the least practicable delay we shall make rate changes which will promote the freedom of movement of *products* of agriculture *affected by that depression,* including livestock. The language quoted is in the nature of a preamble. The resolution indicates that not *all* products of agriculture, including livestock, may be affected by that depression, and calls for a determination by us as to what products are so affected.

Comparisons of Ton-Mile Earnings Called Inconclusive

Referring to the contentions of the carriers that the western roads have had less of a rate advance than roads

[1] Upon argument the carriers state that while their applications are primarily based on section 15a, in a broader and more fundamental sense, they are based upon the right of carriers to a fair return upon property devoted to transportation uses.

in other districts, based on comparisons of ton-mile earning over a period of years, the commission says that "these figures do not fairly measure the relative rate levels because of the differences in the composition of traffic and in average hauls," that the differing percentages of increase which have been approved in the various territorial groups, were based upon evidence of the different conditions existing in the groups including the varying rate levels and the relation of those levels to operating costs, and that "a proper consideration of all these factors leaves little force to the comparisons of relative increases since 1915 in per ton-mile revenues presented by the carriers."

Valuation and Earnings

On the subject of valuation and earnings the report says in part:

No attempt was made by the carriers to establish the value for rate-making purposes in the way in which values are usually shown in rate-making cases. They contented themselves with giving reasons why the aggregate of the investment account should be taken as a conservative rate base for the purposes of these proceedings, especially in view of the fact that the cost of railroad construction is now higher, and probably for some years to come will remain higher, than the cost reflected in the investment accounts.

It was testified by a valuation engineer for the carriers, after consideration of the price changes in each primary account, that the cost of railroad construction was 82 per cent higher in 1925 than in 1914. Although other experts might obtain a different figure, no one will question the fact that the per cent of increase is large, certainly in excess of 50. This index does not apply to the cost of land or to working capital, which average about 12 and from 1 to 2 per cent, respectively, of the values in our valuation reports.

We have before us three principal rates bases suggested for the class I carriers in the western district as a whole: (1) The book value used by the carriers, which is $9,614,106,873 for December 31, 1923, and $9,900,773,458 for December 31, 1924; (2) the *Ex Parte* 74 value as brought down to December 31, 1923, by a representative of the State commissions at the hearing, amounting to $8,265,338,646; and (3) a value based on the available tentative or final reports prepared under section 19a, which, as revised by counsel for State commissions, was $7,215,058,694 as of December 31, 1924. The carriers contend that if we give any substantial consideration to the present price level, the highest of these three rates bases will be found conservative. It may be noted that the *Ex Parte* 74 value, as brought down to date by the witness who presented it, is substantially above the rate base recommended by the State commissions. It should be stated that the carriers question the method used in bringing this value down to date. We shall not attempt in this case to enter into this matter, nor to substitute a new basis of value for that heretofore recognized, because it is not necessary to do so in view of our conclusions. The carriers point out that on the lowest of the three rates bases described above, which rests largely on pre-war unit costs, the net railway operating income failed to reach 5.75 per cent in 1924. In considering the rate adjustments which the carriers have proposed and may propose for the western district it may become necessary to test further the rate base used in *Ex Parte* 74. When that time comes we shall be guided by the more complete facts and conclusions of law which may then be available.

A representative of the western State commissions maintained that the earnings of 1925 taken as a whole understated the present earning power because considerable improvement had taken place in the second half of the year, even after allowing for the usual seasonal increase. It may be noted as tending to substantiate this view that the first quarter of 1926 shows some improvement over the same period in 1925. However, in view of the uncertainties of the business situation, we are inclined to accept the results for the year 1925 as representing the net earning power of western roads for the purposes of this case.

In *Reduced Rates, 1922, supra,* we took 5.75 per cent as a fair rate of return on aggregate value. The carriers contend that that rate of return is too low; the representatives of the State commissions and others contend that it is too high. The State commissions urge that we should reduce this percentage rate in this proceeding. The act specifically provides that the rate of return determined by us to be fair "shall be uniform for all rate groups or territories which may be designated by the commission." Paragraph (3) of section 15a. Before we change our finding as to the fair rate of return, general announcement should be given of the intention to consider that subject at hearings.

Passenger Traffic

Regarding the passenger traffic situation the report says:

A detailed discussion of the evidence relative to the respective earnings on freight and passenger traffic is unnecessary. It discloses a wide disparity in favor of the freight traffic, but also indicates that the passenger traffic is paying some return on the property devoted to that service. Whatever is contributed by the passenger business may reduce correspondingly the burden which the freight traffic would otherwise bear.

We do not subscribe to the proposition that where freight rates are producing, on the property devoted to freight service, the rate of return which has been fixed as fair, we can as a matter of law authorize no increases in such rates to correct deficiencies in aggregate earnings growing out of the inability of the passenger business to meet its full share of the revenue burden. The freight and the passenger services are both essential and both may be subjected to reasonable rates and charges to produce the fair aggregate return authorized by the law even though thereby a higher rate of return may be exacted from the one than from the other. The law and economic conditions have changed since the *Five Per Cent Case,* 31 I. C. C. 392. Changes brought about by the transportation act, 1920, are discussed in the *Wisconsin* and *Dayton-Goose Creek* cases. The growing use of the private automobile and the autobus and truck, which has come with the improvement of public highways, has injected a disturbing economic influence into the railroad situation both as to freight and passenger business. Although this influence has been relatively more adverse in the case of passenger traffic, the loss in passenger revenue growing out of this new competition has, to an extent at least, been offset by augmented freight revenues derived from the carriage of materials for and products of automobile manufactories, and in the carriage of fuel and lubricants used in the operation of the automobile.

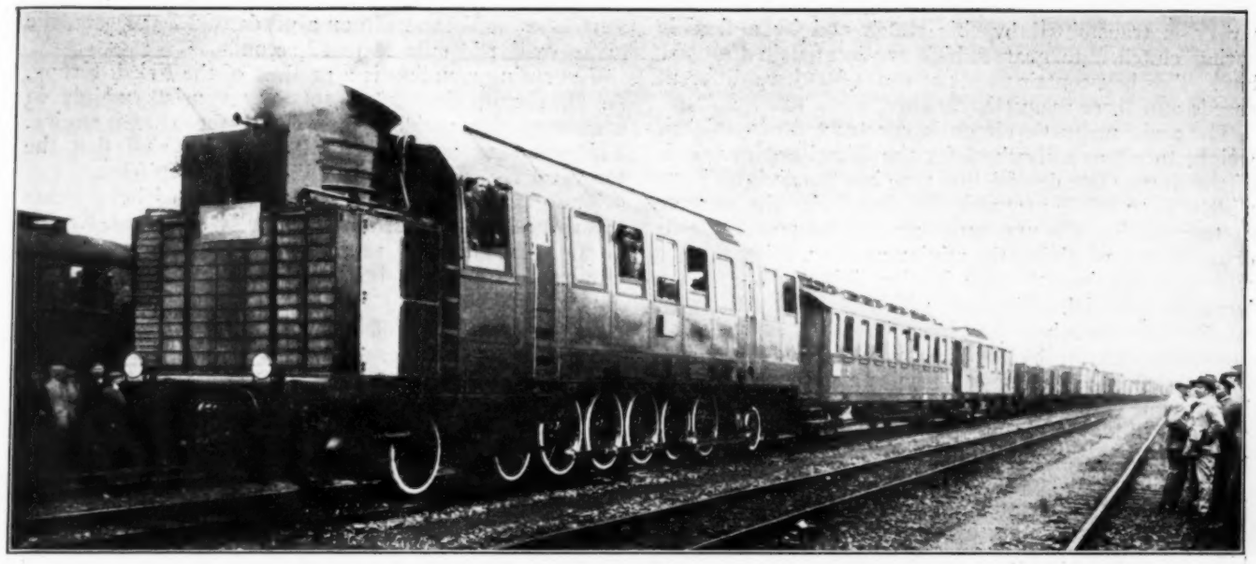
What has been said above should not be construed as indicating that the passenger business may be excused from contributing the greatest possible earnings consonant with adequate service and reasonable charges. On the contrary a public duty rests upon the managements of the carriers, individually and collectively, carefully to survey the passenger situation and to exert every legitimate effort to place this branch of their operations on a more compensatory basis.

Proposals for Separate Rate Groups

Extracts from the report relating to the proposals for the creation of separate rate groups and regarding special treatment of the rates in western trunk line territory are as follows:

As will be noted from the above discussion and that below, apparently the real object sought by the proponents of both groups is to avoid sharing in any increases that may be allowed because of any deficiency in earnings on the part of the western carriers as a whole, and to bring about a relative adjustment under which rates within the proposed groups will be made lower relatively to the remainder of the western district than they now are. If the facts warrant such a shift in relative rate levels, there is nothing to prevent the change being made in a proper proceeding without the creation of separate rate groups under section 15a. If the carriers in certain portions of any rate group are in a more prosperous condition than those in the remainder, this fact may be considered in determining the relative levels in different portions of the same rate group.

On the record we are unable to determine the precise extent to which the rates in western trunk-line territory, whether considered as a whole or as comprising only the area east of the Missouri river, are lower than those in the southwest or in the remainder of the western district. It is clear that rate increases in that territory, particularly the portion east of the Missouri river, will tend both to produce a more uniform level of rates throughout the west and to benefit directly many of the weakest carriers in the western district. We are required under section 15a only to adjust rates by rate groups to produce as nearly as may be a fair return for carriers as a whole in such rate groups. But it is evident that the principal purpose of that section was to afford the public adequate transportation service. This end would clearly not be as adequately served by general increases throughout such a large rate group as the western district, applying alike to weak and strong lines, as by increases confined as far as possible to areas where the rates appear to be on the lowest level and where the weakest roads are located.



The Russian Diesel Locomotive in Service in Germany

Gear Transmission for Diesel Engine

Develops 42,000 lb. tractive force at 4 m.p.h. and a maximum speed of 34.5 m.p.h.—Electro-magnetically operated clutch system applied

By B. A. Wittkuhns, E.E., and N. Fodor, M. E.*

RECOGNITION is due to Prof. George Lomonossoff and Dipl. Ing. Dobrowolski, whose efforts made possible the building of the first two high powered Diesel locomotives, both for Russia, one already in service and the second recently finished.

The first Diesel electric locomotive, a 2-10-2 type, was equipped with a 1,200 b.hp. M.A.M. Diesel engine and has been in actual service for more than one year. The second Diesel locomotive is a 4-10-2 locomotive with gear transmission system and is also equipped with a 1,200 b.hp. M.A.N. Diesel engine. This locomotive designed for freight service, was built by the Hohenzollern Locomotive Works at Duesseldorf, Germany, in collaboration with Prof. Lomonossoff and Magnet-Werk, Eisenach.

The weight of the locomotive in working order is 275,000 lb. The highest tractive force is 42,000 lb. at 4 m.p.h., and the maximum speed is 34.5 m.p.h.

The cooling system for the water and oil is placed at the front of the locomotive. It is of the fin tube type. The fan is driven by an auxiliary Diesel engine which is an M.A.N. airless injection, four cylinder, four cycle, single acting Diesel engine and develops 45 b.hp. at 1,000 r.p.m. Through a countershaft the engine also drives an electric generator for the clutches and lighting, and an auxiliary air compressor. On both sides of the main engine, beneath the platforms, are the fuel oil tanks.

For heating purposes a small steam boiler is provided, which also utilizes the heat of the exhaust gases when the engine is running. The auxiliary cooling water and lubricating oil pumps are driven electrically. A set of storage batteries is placed above the leading truck. The locomotive is provided with Westinghouse brakes, and all necessary devices prescribed for its operation.

The main Diesel engine is of the six-cylinder, vertical, single acting, four cycle, air injection, direct reversible, M.A.N. submarine type and is made of cast steel. The engine develops 1,200 b.hp. at 450 r.p.m. with cylinders of 17¾ in. diameter and 16 9/16 stroke. An overspeed governor prevents the engine from running above 480 r.p.m.

This locomotive is the first to be equipped with a gear transmisison system in which the speed stages are controlled by high power magnetic clutches. Only the recent development in the design and construction of high power electro-magnetically operated clutches made it possible to apply mechanical power transmission on high powered locomotives. The Magnet-Werk of Eisenach, Germany, has already built magnetic clutches for the transmission of more than 20,000 hp. per unit for the power plant of the Badenwerk, Germany, but the main magnetic clutch and the magnetic multiple disc clutches used on this locomotive were the first magnetic clutches ever applied to locomotive service. The Magnet-Werk controls the patents on this transmission system. The power transmission system of the locomotive is clearly shown in the illustrations. By referring to the drawing of the details of the transmission system it will be seen that keyed to the backward extension of the crankshaft is the main magnetic clutch M. The

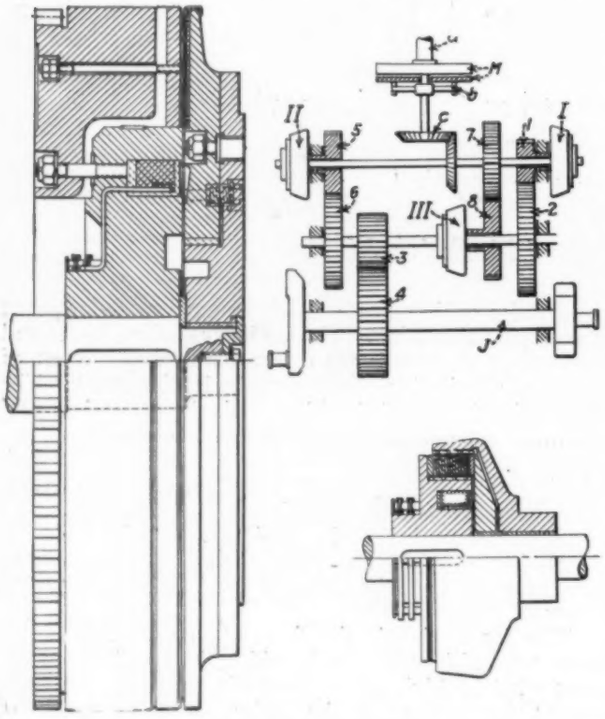
* Mr. Wittkuhns is American representative of the Hohenzollern Locomotive Works, Duesseldorf, Germany, and of Magnet-Werk, Eisenach, Germany.

power is transmitted by this clutch and by a flexible spring clutch *b* to gears which are located in the gear box. This box contains a set of gears for three different speeds and three magnetic clutches.

The main magnetic clutch is constructed of sufficient weight to act as a flywheel for the Diesel engine. It is of the single plate dry friction type but the design differs widely from other magnetic clutches. For the purpose of transmitting the maximum amount of power for its diameter and of giving the minimum wear, it is equipped with an exceptionally large friction lining of special unburnable material. The heat which is developed on the friction surface when the clutch is sliding is negligible and is carired off by the automatic air cooling system of the clutch consisting of radial air gaps between the body of the clutch and the friction plate. Special devices are proivded by replacing the friction lining, making it possible to replace it in less than half an hour.

The clutch develops a maximum torque of 220,000 in.-lb, and can be regulated widely. This regulation is necessary at the starting of the locomotive as the clutch must be engaged at first at a low torque in order to avoid shocks when connecting the running Diesel engine with the driving wheels.

The coil of this clutch is specially wound to give high



Left—The Main MWE Clutch; Upper Right—Scheme of the Clutch and Gear Transmission; Lower Right—MWE Magnetic Multiple Disc Clutch

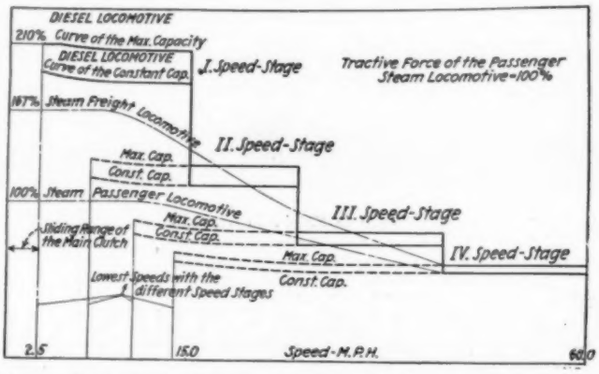
magnetic power with the minimum amount of electric current.

The body of the clutch is manufactured of special soft cast steel with a hysteresis curve which secures the possibility of gradually increasing the torque when the current is switched on. Further means of regulating the torque are provided by special resistors in the electric circuit of the coil. The torque automatically increases gradually and the clutch slides for a few seconds, thus accelerating the locomotive very smoothly in a relatively short time. The tests on the tracks proved that while starting a 1,500-ton train on a grade of 1.2 per cent, the main clutch slid only 10 to 12 seconds.

The spring coupling is a product of the Fried. Krupp, A. G. Essen, Germany. Its duty consists mainly in equalizing the variable torques of the Diesel engine. This coupling accomplishes its duty so well that the torque at the end of this coupling is very uniform.

The gear system, consisting of a pair of bevel gears and several spur gears, was supplied by the Fried. Krupp, A. G. An efficiency as high as 93 per cent has been obtained on the test bed with these gears from main clutch to jack-shaft.

The three speed-stages are controlled by three high



Comparison of the Form of Characteristic Curves of Steam and Diesel Locomotives, the Latter with a Four-Speed Mechanical Transmission

powered magnetic clutches, one for each stage. The changing of speed is accomplished merely by engaging and disengaging the clutches, so that the gears are always in mesh, thus lessening the wear of the gears.

These clutches are the most essential part of the whole locomotive and only after years of special experimental and research work, has it been possible for the Magnet-Werk to design these clutches which had to be exceptionally powerful and could not occupy more space and weight than a clutch which, when constructed in the usual way, only transmits about one-tenth of the power of these special magnetic clutches. Their torque is only slightly smaller than the power of the main magnetic clutch but the space occupied by them and their weight is only a fraction of that of the main magnetic clutch. All thre are of uniform size and of the multiple disc, dry friction type.

The consumption of electric current by the clutches does not exceed 1.3 kw., including the main clutch. Only one of the multiple disc clutches and the main clutch are engaged at the same time, the other two being idle.

The total weight of the gears, clutches, jackshaft and housing is 30,800 lb. The gear system has the following ratios: Through clutch I and gears 1, 2, 3, 4 the ratio is 1:7; through clutch II and gears 5, 6, 3, 4 the ratio is 1:4; through clutch III and gears 7, 8, 3, 4 the ratio is 1:2.

In addition to these gear ratios, the revolutions of the Diesel engine can be changed to such an extent that the revolutions of the driving wheels vary between 14.5 and 225 r.p.m., corresponding to a speed of from 2.25 to 34.5 miles and hour. The reversing of the locomotive is accomplished by reversing the Diesel engine.

There is one control-lever for the Diesel engine, one controller of the drum type for the main clutch and one similar controller for the three multiple disc clutches, the lever of this latter controller having three positions for

the three speeds. The operation of the locomotive is accomplished as follows:

After starting the Diesel engine and accelerating it to its idling speed, the engineman engages clutch I by moving the control lever to the position for speed I. Upon receipt of the starting signal, he engages the main clutch *M* gradually by means of the main controller. After a few seconds, during which the main clutch slides, the train starts to move and accelerates. Further accelerating is made by speeding up the Diesel engine to its maximum revolutions. As soon as this point is reached, the engineman removes the lever of the controller for the three multiple disc clutches to the position of the second speed, thus disengaging clutch I and engaging clutch II. Automatically, by moving the lever, the torque of the main clutch is decreased for a few seconds by varying the resistance of its electric circuit. thus enabling the main clutch to slide for a short time if the respective speeds of Diesel engine and gears do not correspond exactly. After changing the speed, the Diesel engine which has been slowed down, is again accelerated, and the same operations are repeated for changing to the third speed.

In this locomotive the three different control levers have been provided to permit a study of the relations between the three different controls, with the ultimate purpose of designing a simplified one-hand control with which a locomotive of this type will be equipped.

The Diesel locomotive with this gear transmission system maintained a brake thermal efficiency from 30 to 31 per cent. This is 20 per cent more than the efficiency of the 1,200 hp. Diesel electric locomotive. It is to be borne in mind that the geared-driven Diesel locomotive operates with this high efficiency almost on its entire power range, while the steam locomotive maintains its maximum efficiency during limited periods only.

The characteristic curves in one of the illustrations shows that the same Diesel locomotive, if equipped with four proper speed stages, can be used easily for freight or switching and passenger service. Neither an electric locomotive nor the other existing transmission systems can render the same kind of railway service. By simply varying the gear ratios, the tractive efforts and speeds can be easily adjusted to different conditions.

We wish to mention a few advantages of the geared Diesel locomotive. The passenger locomotive having a high tractive force first stage gear can be used for terminal switching service also, thereby eliminating special switching locomotives. This same locomotive, on account of the high tractive force of the first two stages can be advantageously used for freight service, the remaining speed stages being arranged for high speed passenger service.

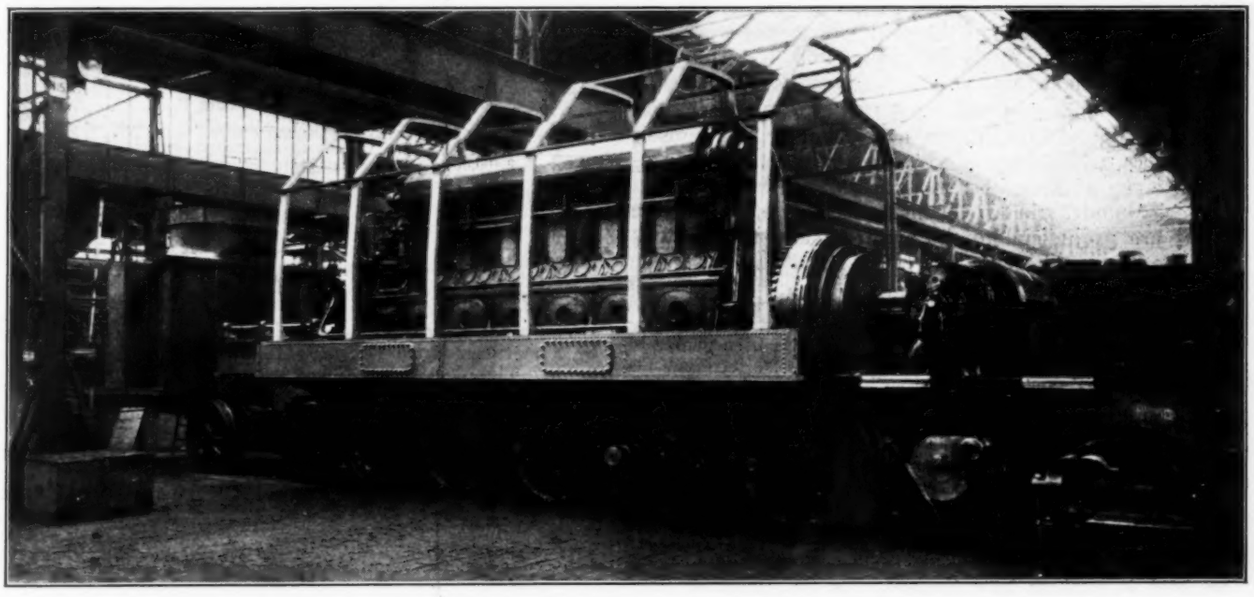
The possibility of thus using one Diesel locomotive for different purposes will result in reduction in the number of locomotive types, standardization of locomotives and Diesel engines on a large scale, and lessening the cost of operation, maintenance, and production.

The design of the locomotive also makes possible the arrangement of multiple unit control.

Doubts may arise regarding the smooth starting and acceleration as well as the flexibility of a Diesel locomotive employing a gear transmission system.

The locomotive has been subjected to thorough and extended tests on the locomotive testing plant in Düsseldorf. Since May 1 it has also undergone tests on the tracks of the German State Railways.

It has been ascertained during these tests that the locomotive starts smoother than a steam locomotive, even with heavy trains on grades. The control of the clutches as mentioned above has proved entirely satisfactory and the speed changes are accomplished without the slightest shocks. After 2,600 miles in heavy freight service, and more than 1,000 main clutch operations, the wear of the friction lining of the main clutch was found to be .011 in. Thus with a variable speed Diesel engine and properly selected gear ratios, the Diesel locomotive with gear transmission system meets every requirement of flexibility in modern railway service.



The 1,200 hp. Diesel Locomotive Without the Cab, Showing the Mechanical Transmission at the Right

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DISSATISFIED that the West Shore (operated under lease by the New York Central) proposes closing a highway crossing in West Englewood, N. J., several residents are attempting through the courts to stop the proposed action. The protestants further allege that control of the West Shore by the New York Central is in violation of the anti-trust law.

B. & M. Readjustment Approved

I. C. C. authorizes issue of new prior preference stock and exchange of bonds

WASHINGTON, D. C.

THE Interstate Commerce Commission, Division 4, has approved the plan for the readjustment of the financial structure of the Boston & Maine, proposed by a general readjustment committee, by authorizing the issues of securities provided for in the plan, $13,000,000 of prior-preference 7 per cent stock to be offered to existing stockholders at par and any balance sold at public auction at not less than par, and $43,522,000 of mortgage bonds, in series maturing at various dates from 1940 to 1947, to be exchanged at not less than par for a like amount of outstanding bonds maturing at various dates from 1925 to 1932. The report is dated July 10 and was made public on July 16. The proceeds from the sale of the prior-preference stock will provide part of the funds for capital improvements proposed for the next three years amounting to $16,130,960.

The only objection presented to the commisison was that of Edmund D. Codman, a stockholder, for himself and others, who intervened, on the ground that the proposed issue of securities is unnecessary, without legal authority under the applicant's charter, and that the terms are prejudicial to the applicant and to his stock and the stock represented by him.

In describing the plan the report says:

It appears that as the result of the meagerness of its income during the years prior to 1924, the applicant has been unable to take advantage of cash discounts on its bills, that its dividends have been passed, and that it has suffered an impairment of its credit, and that its bonds have been selling on the market on a yield basis of from 8 to 9 per cent, thereby precluding the issue of bonds with which to procure money to make necessary improvements and to refund maturing bonds. In order to reestablish the applicant's position and to restore its credit, a general readjustment committee of 16 members was formed, consisting of certain owners of the applicant's securities and representatives of owners, and of representatives of the applicant, being individuals in touch with public sentiment toward the applicant in northern New England. On the committee three savings banks, two insurance companies, and three banking houses are represented. The committee formulated and executed under date of September 1, 1925, a plan and agreement for the readjustment of the applicant's financial structure, hereinafter called the plan. The securities are to be issued in accordance with that plan.

Funded debt of the applicant not dealt with in the plan amounts to $80,601,479, of which $48,685,479 is held by the United States, and $31,916,000 is held by the public. The bonds held by the public mature at various times subsequent to 1932. The bonds held by the United States bear interest at the rate of 6 per cent per annum, and mature in installments of $29,298,500 on January 1, 1929; $5,443,979 on November 1, 1930; $3,049,000 on October 1, 1931; $5,894,000 on January 1, 1934; and $5,000,000 on June 1, 1935.

To comply with statutory requirements, the proposed prior-preference stock will be first offered to existing stockholders at par, and any amount not taken by them will be offered for sale at public auction at not less than par. Each assenting stockholder is required to elect whether he will purchase his proportionate amount of the prior-preference stock or will surrender to the committee a portion of the stock held by him. The amounts are stated as follows:

Class of stock	Prior preference stock Par value	Stock to be surrendered Per cent
Common	$20	32
Preferred stock	15	12
First preferred stock, Class A	12	12
" " " " B	12	8
" " " " C	12	8
" " " " D	12	6½
" " " " E	12	12

It appears that, of the total of 814,728 shares of stock outstanding at the close of business on May 22, 1926, the holders of 700,174 shares have assented to the plan, of which the holders of 681,989 shares have elected to purchase prior-preference stock and the holders of 18,185 shares have elected to surrender the respective portions of their stock.

Old Bonds to Be Refunded

The record shows that, to May 22, 1926, holders of $37,803,000 of the $43,522,000 of bonds dealt with in the plan have assented to it. By assenting to the plan the holders become entitled to receive a like principal amount of the proposed mortgage bonds, which will be issued in series for principal amounts and maturities as follows:

Series	Principal amount	Maturity	To be issued for a like principal amount of	
Q	$500,000	Feb. 2, 1940	Boston & Maine	3½s
T	10,000,000	Sept. 1, 1941	" "	4s
AA	11,700,000	April 1, 1944	" "	4½s
DD	3,843,000	June 1, 1945	" "	6s
EE	609,000	Jan. 1, 1946	" "	7s
R	3,660,000	May 1, 1940	Fitchburg R. R.	4s
V	2,750,000	March 1, 1942	" "	4s
W	2,000,000	April 1, 1942	" "	4s
Y	1,450,000	Jan. 1, 1943	" "	4s
Z	2,400,000	May 1, 1943	" "	4½s
FF	1,200,000	Jan. 1, 1947	" "	4½s
S	500,000	Sept. 1, 1940	Boston & Lowell	3½s
U	500,000	Nov. 1, 1941	" "	4s
X	325,000	July 1, 1942	" "	4s
BB	350,000	April 1, 1944	" "	4s
GG	1,000,000	April 1, 1947	" "	4s
CC	735,000	Jan. 1, 1945	Worcester, Nashua & Rochester	4s
Total,	$43,522,000			

The bonds will be issued under and pursuant to, and secured by, a mortgage dated December 1, 1919, made by the applicant to the Old Colony Trust Company and S. Parkman Shaw, Jr., trustees. After January 1, 1930, all or any part of any series will be redeemable on any interest date at 102 and accrued interest. The series Q. R. and S bonds will bear interest at the rate of 5 per cent per annum, payable semiannually. Bonds of the remaining series will bear interest, payable semiannually at annual rates, to and including the dates named and thereafter at 5 per cent, as follows:

Series	Amount	Interest At rate of Per cent	Interest Payable until
T	$10,000,000	4	September 1, 1926
U	500,000	4	November 1, 1926
V	2,750,000	4	March 1, 1927
W	2,000,000	4	April 1, 1927
X	325,000	4	July 1, 1927
Y	1,450,000	4	January 1, 1928
Z	2,400,000	4½	May 1, 1928
AA	11,700,000	4½	April 1, 1929
BB	350,000	4	April 1, 1929
CC	735,000	4	January 1, 1930
DD	3,843,000	6	June 1, 1930
EE	609,000	7	January 1, 1931
FF	1,200,000	4½	January 1, 1932
GG	1,000,000	4	April 1, 1932

Stocks

The plan contemplates that assenting holders of first preferred stock will give up to the committee their dividends thereon, accumulated and unpaid to July 1, 1925, and dividends to accumulate thereon thereafter until July 1, 1927. It appears that one-half of the dividends are to be given up absolutely and one-half conditionally. As to the one-half conditionally given up, the holders of first-preferred stock and common stock assenting to the plan, agree as between themselves that in any year in which dividends in excess of 6 per cent are paid on the common stock, one-half of such excess shall be paid ratably to assenting holders of the first-preferred stock, such payments to continue until such holders of first-preferred stock have received payments equal to the dividends conditionally given up.

The dividends given up to the committee may be used for readjustment expenses. In view of the number of shares of stock available for the committee's use from stockholders electing to surrender a portion of their stock, it now appears probable that most of the dividends given up will be turned over by the committee to the applicant for its corporate purposes.

It is stated that holders of stocks and bonds not assenting to the plan will retain their present status.

The proposed prior-preference stock will be entitled to cumulative dividends at the rate of 7 per cent per annum, payable January 1 and July 1 in each year, before any dividends are payable on any of the other classes of stock. In case of liquidation, holders of prior-preference stock are entitled to receive the par amount of their shares plus accrued and unpaid dividends before any distribution is made to holders of other classes of stock. The prior-preference stock will be redeemable as a whole on January 1 or July 1 in any year after January 1, 1930 at $110 a share and accumulated dividends. It will have voting rights, except upon the question of its redemption. Further provision is made that no stock having any preference or priority equal or superior to the prior-preference stock shall be created, nor that any such stock in excess of $13,000,000 shall be issued without a two-thirds affirmative vote of the then outstanding prior-preference stock, with the exception that not exceeding $43,522,000 of such stock may be issued in conversion of the bonds for the issue of which authority is sought herein.

To the end that the applicant may receive the proceeds of the prior-preference stock as needed for the prospective additions and betterments, payment will be made therefor in seven semi-annual installments. For each share the first installment will be $10 and the remaining installments $15 each, any premium on the stock to be added to the first installment. No stock certificates will be delivered until the shares are fully paid, but installments paid will bear interest at the rate of 7 per cent per annum in favor of those paying them.

Capital Expenditures

The applicant proposes to expend during the next three years for additions and betterments approximately $16,130,960, which will be chargeable to capital account. A list of the principal items of the proposed expenditures is filed with the application and includes such projects as improved and enlarged terminal yards at Boston, additional trackage, including double tracking, enlarging the clearances of the Hoosac Tunnel, strengthening bridges, ballasting track, constructing a general office building, improving the coal discharge and storage plan at Mystic Wharf, Mass., improvements to and purchase of locomotives and equipment, and purchase of gasoline rail cars. The applicant states that these additions and betterments will enable it to operate more economically and efficiently. The proceeds from sale of the prior-preference stock will provide part of the funds for these projects.

To provide for conversion of the proposed mortgage bonds, the applicant will enter into a collateral agreement with the Old Colony Trust Company and S. Parkman Shaw, Jr., trustees under the mortgage under which the bonds will be issued. This agreement will not be supplemental to the mortgage. By the agreement the bonds may, at the holder's option, be converted between January 1, 1930, and January 1, 1940, into 7 per cent prior-preference stock at the rate of 5 shares of stock for each $500, principal amount, of bonds. During the years 1930 to 1933, inclusive, the amount of bonds to be converted in any one year will be limited to not more than $7,500,000, but if all of the prior-preference stock shall be called for redemption prior to April 1, 1934, then this limitation will not be applicable. The agreement will require the applicant to use its best efforts to obtain such legislative authority and approval of public authorities as may be necessary to make the conversion lawful, and if, at the time conversion is sought, it shall not be lawful for the applicant to issue prior-preference stock in exchange for the bonds, then the applicant will deliver shares of prior-preference stock previously issued, or, at its option, will pay a sum equal to the then conversion value of the bonds presented for exchange, whereupon the bonds will be stamped showing that they are no longer entitled to the benefits conferred by the collateral agreement. There will be placed on the back of each of the proposed bonds a notation setting forth the conversion provisions of the collateral agreement and stating in condensed form its contents.

In the comment on the plan the report says:

The conversion privileges appear to have been accorded to the holders of the bonds to meet contentions of bondholders for a larger interest rate than 5 per cent on the new bonds. The divergent interests finally came to an agreement that the outstanding bonds should be refunded at a 5 per cent rate, that $13,000,000 should be spent for additions and betterments, thereby strengthening the security of the bonds, and that the privilege of converting into prior-preference stock should be accorded to holders of the new bonds. Conversion of all the bonds into prior-preference stock will increase the applicant's dividend requirements by $3,046,540 and decrease its interest requirements by $2,176,100, the net increase being $870,440. It is to be noted, however, that interest constitutes a fixed charge, while dividends are contingent upon ability to pay them. Whether the grant of conversion privileges in this case is prudent may be doubted, but the stockholders, who are most vitally interested, have by more than a two-thirds vote authorized the issue of the convertible bonds. Accepting the generally recognized principle that stockholders should control the corporation, we feel that we ought not to interpose unless it is shown that the proposed action would be incompatible with the public interest. The application now before us does not request authority for the issue of prior-preference stock in conversion of the bonds. It is stated that should it become necessary to issue additional prior-preference stock, the requirements of the law as to the filing of an application will be complied with by the applicant.

While the issue of bonds as proposed will not increase the amount of the applicant's bonds outstanding, yet it will, after 1932, increase the annual interest charges by $268,590. The annual dividends on the proposed prior-preference stock will amount to $910,000. It was testified that the proposed additions and betterments will result in economies and savings considerably in excess of the amounts required for the additional interest and dividends. It also appears that, although the applicant was unable to make a distribution of its earnings for the year 1925, yet they were sufficient in amount to have paid its fixed charges, dividends on the proposed prior-preference stock, on the first preferred stock, and some dividends on the common stock. The earnings for the year mentioned appear to have been due to favorable operating conditions. The testimony, however, shows that the applicant's future depends more largely upon its ability to effect economies and efficiency in operation by the prudent making of expenditures for needful facilities required to produce such results.

The figures shown below, taken from table 17 of the applicant's Exhibit 9, give in condensed form the principal items appearing in its income account for each of the past ten years:

	Operating revenues	Operating expenses	Tax accruals	Net railway operating income
1916	$55,383,545	$38,251,716	$2,091,089	$12,444,382
1917	59,450,779	47,164,941	2,156,649	7,142,223
1918	70,157,584	64,779,651	2,317,524	1,503,196
1919	72,935,146	67,144,063	3,043,387	1,749,300
1920	86,652,745	90,989,432	3,001,088	*11,918,220
1921	78,289,750	73,833,473	2,668,423	*1,401,768
1922	79,720,085	67,164,593	2,571,276	6,296,285
1923	86,310,941	75,275,588	2,935,235	3,079,241
1924	78,697,298	63,912,556	3,040,802	8,972,023
1925[1]	81,628,763	62,987,463	3,187,885	12,407,815

[1] Figures include returns for Vermont Valley and Sullivan County Railroads.
* Deficit.

	Net income	Revenue ton-miles (thousands)	Passenger-miles (thousands)
1916	$4,876,929	3,191,616	849,859
1917	*334,277	3,341,898	926,966
1918	257,901	3,612,615	882,382
1919	2,657,523	3,283,719	976,112
1920	614,729	3,705,528	1,014,735
1921	*6,612,421	2,673,769	876,113
1922	27,991	2,689,915	847,482
1923	*3,491,070	3,103,817	867,728
1924	1,772,737	2,744,214	772,428
1925[1]	5,468,909	2,955,885	740,127

* Deficit.
[1] Figures include returns for Vermont Valley and Sullivan County Railroads.

Testimony was given to the effect that the total cost of the readjustment would be not more than $30,000. The readjustment committee is to serve without compensation. There had been paid to May 20, 1926, a total of $38,000 of miscellaneous expenses such as legal expenses, depositary fees, etc. It was estimated that the total miscellaneous expenses would amount to about $75,000. In connection with carrying out the plan an underwriting syndicate was formed for the purpose of communicating with some twelve thousand stockholders and seven thousand bondholders. The syndicate commission is stated at 3½ per cent on the $13,000,000 of prior-preference stock, or $455,000; but to keep the cost down the managers of the syndicate agreed to serve without compensation, which resulted in a reduction of $155,000 in the amount of the syndicate commission. The New York, New Haven & Hartford, which holds approximately one-third of the applicant's stocks, underwrote the amount of its interest in the proposed prior-preference stock, agreeing to forego sharing in the commission, thereby making a further reduction of $150,000 in this amount. These arrangements result in reducing the syndicate commission to $150,000, which will be payable to approximately 80 different bond and stock houses for their services in calling upon stockholders and bondholders to procure their assent to the plan. The syndicate is also to receive a sales commission of 3 per cent on such an amount of the prior-preference stock as is not taken by the existing stockholders.

the applicant. To controvert the intervener's objections, the applicant produced testimony to the effect that the same necessity now exists for going forward with the plan as when it was first formulated; that the recent improvement in the market quotations of the applicant's securities are attributable to better earnings, to lower cost of money, and to the belief that the plan would be consummated and the applicant's credit thereby restored; and that, while limited amounts of bonds might be floated at interest rates from 6½ to 7 per cent, it would not be practicable to dispose of a sufficient amount of bonds to refund the applicant's matured and maturing bonds, with the consequence that the money obtained would be at too great a cost and would only partially meet the refunding requirements. Giving the gratifying and encouraging earnings in 1924 and 1925 their full effect, they do not constitute assurance that with the applicant's present financial structure its credit is restored upon a basis of permanent prosperity.

The Intervener's Objections Considered

Without offering evidence in support of the objections made by the intervener, his counsel submitted a statement in explanation thereof and cross-examined the witness produced by

The contention advanced by the intervener that the proposed issue is not legal under the applicant's charter from the States of Maine and New Hampshire, takes its basis in the provision made for the conversion of bonds into prior-preference stock. As has heretofore been pointed out, the instant application is not for the issue of stock in conversion of bonds. So far as the conversion privilege accorded to the proposed bonds is concerned, it does not appear to present a sufficient ground for refusing to grant authority to issue the bonds.

The issue of the proposed prior-preference stock has been authorized by an act of the legislature of Massachusetts, dated May 1, 1925. That act also provides that mortgage bonds carrying the conversion privilege may, subject to the approval of the Department of Public Utilities of Massachusetts, be issued by the applicant. By the act the bonds are made legal investments for savings banks. The Department of Public Utilities of Massachusetts on May 21, 1926, approved the issue by the applicant of $13,000,000 of prior-preference stock and $37,531,000 of mortgage bonds, the latter being the amount of bonds then deposited under the plan. The report by the Department of Public Utilities states that it is prepared to approve the issue of the remainder of the bonds, amounting to $5,991,000, when they have been deposited.

We find that the proposed issue of prior-preference stock and mortgage bonds by the applicant as aforesaid (a) is for lawful objects within its corporate purposes, and compatible with the public interest, which are necessary and appropriate for and consistent with the proper performance by it of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) is reasonably necessary and appropriate for such purposes.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended July 10 amounted to 900,977 cars, a decrease of 85,916 cars as compared with the corresponding week of last year and of 9,006 cars as compared with 1924 because of the holiday this year on July 5, which destroys the effect of comparisons. Increases as compared with last year were shown in the loading of grain and grain products and coke, while other classes of commodities showed reductions. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING

Week Ended Saturday, July 10, 1926

Districts	1926	1925	1924
Eastern	209,179	233,224	212,967
Allegheny	181,493	199,929	184,301
Pocahontas	48,905	51,348	42,429
Southern	130,737	136,213	128,546
Northwestern	135,164	150,432	137,766
Central Western	127,052	138,806	141,100
Southwestern	68,447	76,941	62,874
Total Western Districts	330,663	366,179	341,740
Total All Roads	900,977	986,893	909,983
Commodities			
Grain and Grain Products	43,728	38,284	41,907
Live Stock	25,827	27,693	33,824
Coal	147,780	162,080	146,179
Coke	10,915	9,384	7,140
Forest Products	51,729	61,238	57,873
Ore	65,365	66,192	59,423
Mdse., L. C. L.	226,367	254,192	234,286
Miscellaneous	329,266	367,830	329,351
July 10	900,977	986,893	909,983
July 3	1,072,624	866,199	757,904
June 26	1,062,252	993,173	908,251
June 19	1,043,720	984,583	903,546
June 12	1,060,214	989,873	902,592
Cumulative total, 28 weeks	27,010,065	26,181,582	24,853,039

The freight car surplus for the week ended July 7 averaged 239,167 cars, including 72,265 coal cars and 123,496 box cars.

THE INTERSTATE COMMERCE COMMISSION has postponed the effective date of its second automatic train control order to December 31 in the case of the Delaware, Lackawanna & Western and the Lehigh Valley, and to January 1 in the case of the Chicago & North Western and the New York, New Haven & Hartford.

Freight Train Entering Cordova, Spain

The Mobile Fire Fighting Forces Have Quelled Many an Outbreak Which Otherwise Might Have Been Disastrous

How the Canadian National Helps to Prevent Forest Fires

Selfish interest alone is enough to justify elaborate organization to protect and conserve the timber supply

CONSTANTLY confronted with the hazard of forest fires, and recognizing that forest protection is largely a matter of organization and constant vigilance on the part of all employees to prevent the outbreaks of fire, the Canadian National Railway System has developed an elaborate and effective organization of its personnel and equipment to protect the Canadian forests which are one of the country's greatest assets. From many standpoints the Canadian National has a vital interest in the protection of the Canadian forests, but looking upon the subject alone from a business point of view, it realizes that as a railway enterprise, the forests represent so much actual and potential traffic, and that as such, the railroad must protect and conserve them to the limit of its ability.

From this point of view alone, the Canadian National system is vitally interested in forest protection and is preaching the need of conservation in season and out of season. Through every possible medium it is constantly urging, not only its own employees, but also the public, to assist in this national work for, as a railway company, its interest in the forests is second only to that of the lumbering interests.

Speaking still from the business standpoint, it is interesting to note that during the past year more than 9,515,000 tons of forest products were carried on Canadian National lines, and that the forest products used by the Canadian National system during the same period reached a value of $13,859,449. When it is realized that approximately 240,000 cars were required to carry the forest products of Canada during the year, and that 10,000,000 ft. of track would be required to accommodate all of these cars at one time, it is easy to visualize the importance of the forests to the Canadian National. Divided into trains of 50 cars each, it would require 5,000 engines to move these cars, which would stretch two-thirds of the way across the Dominion. The movement of forest products for one year would alone require the service of some 25,000 men, so that it is obvious that not only the company but every one of its employees has a vital interest in this movement to maintain the future tonnage of forest products over their lines.

System Is Highly Organized

Recognizing that this end can be attained only by effective forest protection, which is largely a matter of concerted and organized effort, the Canadian National system has developed a special forest fire department with offices at the system headquarters, and has placed it in the hands of a man whose experience in forestry work has covered a wide field. Two assistants were provided, one in western Canada and one in Ontario. It has also developed a definite system to cope with this problem. The important phases of this system include the patrolling of hazardous areas, provision for the systematic reporting of fires, constant inspection of fire-fighting appliances, and the organization of ways and means for combatting outbreaks. Beginning with prevention, which is perhaps the most vital part of the organization work, patrols are made by section forces, augmented by special patrols in forested areas and where special hazards are known to exist.

The patrolling of these areas is done by men on speeders or motor cars and in some cases on foot. The men engaged in this work report any instances where the cleaning up of fire hazards is necessary, or, if possible, remove the hazards themselves. In addition to the

patrols there is the constant guard by train crews, agents and other operating forces and a continual clean-up drive to eliminate the existence of fire hazards. At the terminals, the constant inspection of locomotives and the testing of spark-arresting devices is carried on with a view to reducing dangers from this source. At the end of every run, locomotives are inspected and in this way the danger from hot cinders is greatly reduced. Improvements to front ends of locomotives are being tried all the time, and applied when such appliances are found suitable. Some of these improvements, which have been instrumental in reducing fire hazards, are the installation of improved ashpans, wider fire grates, and brick arches, all of which have a tendency to reduce dangers from cinders and which break up the particles of live coal which may be ejected.

In the terminals, the installation of fire-fighting appliances and the liberal distribution of hose which may be attached to yard engines, has provided a means of combating outbreaks. The organization of fire brigades among the company employees, and holding drills twice monthly, with regional and system competitions to develop their efficiency, are also important phases of the system in the checking of outbreaks at shops and terminals where heavy losses might otherwise occur.

While forming the details of the fire-fighting program, the company's equipment was organized on a mobile footing. The yard and switching engines were equipped with a hose pipe connection to the injector which is specially designed for fire-fighting purposes. Nineteen fire-fighting tank cars, carrying from 3,000 to 13,000 gal. of water, were placed at strategic points across the Dominion where fire hazards were greatest. Small pack-sack hand sprays which carry five gallons of water and can be shouldered by the fire fighters were liberally distributed and have been found efficient in controlling right-of-way burning operations and extinguishing burning logs, ties and telegraph poles. All fire patrols are furnished with grub holes, axes, shovels and pails, which in some instances are mounted on small motor cars and hand velocipedes. In all forested arears, emergency fire-fighting equipment is carried at the section house and is available for immediate use.

For the prevention of fire, the Canadian National has also a system of fire-guarding through forested and prairie areas where fire danger exists. The provision and constant maintenance of over 3,440 miles of fire-guards on the system shows that this feature of the work is not neglected. Along the forested sections, the right-of-way is cleared of brush and slash so that danger from these sources is reduced to a minimum.

With the knowledge that the first few minutes of conflagration are the most vital in the fight for its extinction, care has been taken with the fire reporting system, so that knowledge of any outbreak, its extent and the need of forces to combat it, are placed in the hands of the officers directly responsible with a minimum of delay. Special telegraphic forms, carrying this information are provided at all points where they are likely to be required, and by the use of a key system, the employee discovering an outbreak of fire is enabled to place all necessary information in the hands of the proper officers by telegraph and therefore with a minimum loss of time. All such fire reports are given precedence on the wire, and fire-fighting forces can therefore be summoned rapidly to the scene of an outbreak.

Very few other fire reports are required except those devised to record the activities of men solely engaged in fire prevention work and a summary report giving all information pertinent to a fire and the damage incurred. This latter report is one of much importance and is given prompt attention with the view of making an example of every fire and securing data on which to broaden the scope of the company's forest policy.

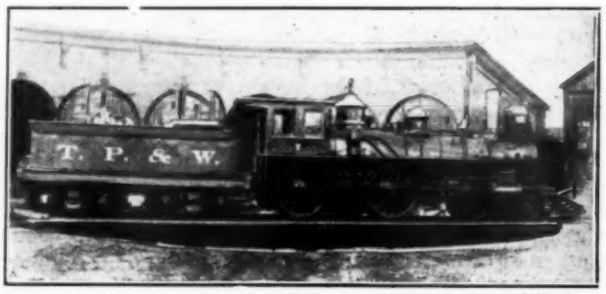
Organization and Education Bring Results

Publicity is another large and important item in carrying out the Canadian National's fire protection policy. The pages of the company's magazine are open to the forest fire department and a large number of articles have been printed dealing with many phases of fire prevention and forestry life. Forest fire prevention has been given a prominent place on the program of every staff meeting, and special forest protection meetings have been arranged in the principal cities of Canada where government and technically trained foresters have discussed this subject with railroad officers and representatives of every organization connected with forestry work in the Dominion.

Other phases of the publicity given forest protection are the use of the Canadian radio broadcasting stations, posters, slogans, etc. In a little over a year, 250 two-minute talks and 33 addresses on forest fire prevention were given over the ten Canadian radio stations by prominent men. Almost every pamphlet published by the company has some terse prominent reference to forests and their protection, and "dodgers" issued in co-operation with the Canadian Forestry Association, embodying fire warnings to passengers, are frequently attached to the menu cards in the company's diners.

Following out these practices the Canadian National has won the confidence and co-operation of the Canadian government officials in its fire prevention work. Not long ago the railways were charged with being the chief cause of forest fires in that country. Today, according to the fire prevention officers of the Board of Railway Commissioners, they are among the least of the offenders. The figures for 1925 show a total of 1,067 fires on Canadian National lines reported and extinguished by the railroad forces, and of these only 276 were reported as attributed to railroad causes. These figures indicate that on a strip of territory 300 ft. wide and some 3,000 miles in length, the railway extinguished 675 fires for which it was in no wise responsible. On the right-of-way itself, 116 fires were reported and extinguished which arose from causes other than the railway. The percentages of causes for the fires reported show locomotives responsible for 39.45 per cent and railway clearing operations 8.35 per cent. The remainder of the list comprises campers, settlers clearing brush, unknown causes and spontaneous combustion.

During the year 1925 a total of 24,285 acres were burned over with a loss of property of $64,112. A large percentage of this damage occurred in British Columbia, where exceptionally dry weather caused increased fire hazards in the railway territory.



An Old Rogers Locomotive

The Branch Lines Are Constructed with Sharp Curves and Steep Grades

How Logging Railroads Are Built and Operated*

Standards of practice differ widely from those employed by common carriers

By Walter J. Ryan

Civil Engineer, Weyerhaeuser Timber Company, Tacoma, Wash.

THE primary function of a logging railroad is the transportation of logs from the woods to the sawmill. This service was originally performed by teams of oxen that dragged the logs over poles laid across the roads. The modern logging railroad has progressed a long way toward standard railway practice but it still bears some of the characteristics of this ancestor, the "skid road."

The first logging railroads were built without the aid of an engineer. It was part of the duty of the logging superintendent to locate his railroads, and he had little time or opportunity to plan further ahead than the section he was working in. These roads were extended from year to year, until the easy country was logged off or some serious obstacle to further progress was encountered. About this time, locating engineers were called in to get out of the difficulties, and the original lines had to be abandoned and a new line built to reach the tracts of timber farther back. These engineers were given no opportunity to learn the requirements of the logger and often the results were not satisfactory. Finally there came a realization that an engineer was required who understood logging, and the Pacific Logging Congress in 1912 began an active campaign for "the creation of the profession of logging engineering as a distinct branch of mechanical science." As a result of this effort, the western universities have established courses and are graduating classes each year with a degree in logging engineering.

The larger operations now maintain engineering departments, and there are also a number of engineering firms who do all of the work for certain operations, usually the smaller ones, that do not feel justified in maintaining an engineer in continuous employment. There are many phases of the logging operation in which the services of an engineer may be used but the principal part of his duty consists in the location of railroads.

Controlling Considerations in Location Surveys

The object of a logging railroad location is not to provide a route through a territory or to connect two definite points, but to serve a given area with a network of rails.

Any part of a tract of timber that is not within "yarding distance" of a railroad is in the same position as a piece of land above the ditch on an irrigation project. This "yarding distance" is the distance that it is economical to bring logs from the stump to the "landing" where they are loaded on cars. It varies from 600 to 3,000 ft. with the different types of logging equipment

*Abstracted from a paper presented at the summer meeting of the American Society of Civil Engineers at Seattle, Wash., on July 14.

in use. Thus the spacing of the branch lines will vary from a quarter of a mile to a mile.

It is the relationship between the cost of logging by different methods and the cost of the railroad that determines the type of equipment best suited to a given operation. As railroad construction becomes more difficult, more expense is justified for logging equipment and labor to give longer yarding.

Every phase of railroad construction and operation is intimately connected with the logging which it is to serve, and a reconnoissance for a railroad is incomplete unless it covers a study of the area from the standpoint of logging as well as railroading. The modern timber cruiser, who examines a tract of timber land, not only makes a detailed report of the timber that he finds, by species and grades, but also prepares a contour map of the area. These cruisers' maps are made by pacing distances and determining elevations by aneroid barometers. They are usually made on a scale of about six inches to one mile, with contour intervals of from 25 to 100 ft. The United States Geological Survey has mapped part of the timbered area of the western states, but there are some districts for which there are no maps worthy of the name.

The maps available are made the basis of preliminary study, but most operators recognize the value of an accurate contour map and the reconnoissance survey usually entails the employment of a mapping party. Well-made maps, with accurate cruises of the timber, enable the operation to be planned so that the railroads can be built in the proper location for economical logging and with the mininum of cost.

Standards of Construction

From the place where the logging railroad leaves the timber to the log dump at the mill or rafting ground, the route is determined on considerations which are no different from those which apply in standard railway or highway practice, except that controlling rates of grade and curvature may have been determined by conditions met in the timber. This route to the timber and one or more lines through the tract make up the main line over which full trains are handled. Grades as high as four per cent and curves as sharp as 24 deg. are used on these main lines, and the construction cost runs as high as $50,000 per mile.

Branches and spurs serve the logging, and from these the loaded cars are switched by lighter locomotives. Geared locomotives permit the use of curvature as sharp as 40 deg. and grades of six per cent on these spurs. Where timber is out of reach of lines built to these standards inclines are resorted to.

The field work of location is usually done with parties of from three to six men. A transit or compass preliminary line is run, often with an axeman, a chainman and an instrumentman, using a 500-ft. tape and setting stakes at 100-ft. stations. The same party runs levels and takes topography. The projection made from this preliminary is run out in the field or the center line is staked by offsets from the preliminary line. A small party can do the locating and look after the construction of 10 or 15 miles of road a year, and this proves more satisfactory than employing a larger party on intermittent work.

Use Dynamite for Clearing

Clearing the right-of-way is often the most expensive part of the railroad construction. A great deal of road has been built with no form of power except dynamite, where there were stumps and logs up to 10 ft. in diameter to be removed. Horses and steam logging "donkey" engines have been used for the clearing, and recently gasoline "donkeys" and tractors are coming into use. Where power shovels or drag lines are used for the grading, the same machine often does the "chunking out." Culverts are usually built of logs. Where long life is required, western red fir is used, as it resists decay almost completely under the conditions found in most culverts.

Until recently, the grading was done very largely by hand. The only power commonly employed was a drag scraper pulled by a logging engine. Limited use has been made of steam shovels, but the small revolving shovel or dragline on crawler treads is now doing a large portion of the work. It is common practice to waste the cuts and borrow for the fills, where the work is within the range of the machine used. The shovel runner and his helper may constitute the entire grading crew, the finishing being left to the crew that lays the track. When it is necessary to haul the excavated material, it

A Logging Operation in the Northwest

is customary to use dump cars on tracks, although motor trucks are used to a limited extent.

Bridge Work Does Not Follow Railway Practice

The construction of bridges has shown more variation from standard railroad practice than any other feature of logging railroad work. The bridges that were built on the skid roads of bull-team days were cribs of logs with a solid deck. The first railroads were laid over this same type of bridge with ballast under the ties. The logs in these bridges were seldom salvaged, so the cost became excessive when timber acquired a greater value. Frame and pile trestles are now used and they show wide variations in design. Pile trestles are built of material cut at the site, when it is available in suitable sizes. The caps and stringers are hewed to size and small poles used for bracing. In many stands of timber, there are no trees suitable for bridge material, and it is necessary to haul timber in by rail from the sawmill or another part of the operation. Pile trestles can be constructed cheaply when suitable material is available on the ground.

For many years some operators built their spurs entirely on trestle as they found it to cost less than grading and ballast.

Sawed timbers are available with depths of as much as 48 in. and are suitable for spans up to 40 ft. Logs are used as girders for spans as long as 50 ft. without any form of truss. Spans of 100 ft. have been built by placing a solid deck of logs on falsework and laying ties about 20 ft. in length on top of this deck. A large log is placed on top of the ties at each side of the bridge. The cap of the falsework is bolted through the logs above and below the ties to act as a floor beam, and the whole structure is laced together with wire cable. On high trestles, these log spans may be used to provide the necessary channel clearance and frame bents erected on them to carry the deck.

Pile trestles of 100 ft. or more in height are frequently built. Where the ground allows little or no penetration for piling, the sticks are set, butt down, on the rock or hard pan and held in place by the driver until capped and braced. Piles as long as 100 ft. with a top diameter of 14 in., have been used in this manner.

Use Cableways for Bridge Erection

Cableways stretched above the site of the structure are often used in the erection of high trestles to deliver material. In case of a framed structure they are used to raise the bents. Wire rope up to two inches in diameter is usually available around a logging operation and, with the use of a logging "donkey" for power, it is possible to design such a cableway for very heavy loads. Howe trusses and steel girders and truss spans are in use, and their design and construction conform to standard railroad practice.

Tunnels have been built on some logging railroads and are usually timber lined. The only variation from standard practice has been the occasioned adoption of a wider section to provide clearance for wide loads, due to knots or limbs on the logs. Some common carrier roads have refused to accept logs for haul over lines with tunnels, but few accidents have been reported from this cause.

Track laying is usually done from a push car or from cars handled by a locomotive. A car is usually arranged so the rails are placed on the floor or bunks and the ties piled on the same car on timbers to hold them clear of the rails. The ties are rolled off the end of the car and the rail pulled out and placed by hand. Track laying machines are used on some operations.

Track Standards

The ties are usually made from local timbers, hewed in the woods to a thickness of six inches. Where the operation is directly connected with a saw-mill, sawed ties are frequently used and are of a six by eight or seven by nine section.

Good ballast is almost an essential along the west slope of the Cascades. Gravel is used where available and, in some cases, it is purchased on cars and delivered by the standard railroads. Most loggers have ballast pits at one or more places on their operations and load into center dump cars.

The most common weight of rail is 60 lb. per yard, but some lighter rail is in use and some roads are adopting heavier sections. Relay rail, purchased from the railroads, has been used almost entirely, though some foreign rail and a small amount of new American rolled rail have been laid.

The sharp curves usually require some lateral support for the rail in the form of rail braces. Some roads are using tie plates on the curves and usually find that they hold the rail without the use of braces. When it is necessary to put locomotives with blind drivers around the very sharp curves, five rails are used, two inner guard rails and a rail outside of the track rail on the inside of the curve in addition to the running rails.

Logging railroads are confronted with a serious problem from creeping rail. The loaded traffic is all in one direction and that is usually down grade. The common practice has been to allow the rail to run and place points in the track to prevent buckling. The gaps that occur are filled with "Dutchmen" and the broken angle bars replaced. Some effort has been made to hold the track by driving piling in front of long ties and by tying the track to stumps with pieces of cable. Rail anchors have proved successful in some cases and are coming into more general use.

The Cars Are of Special Types

The cars originally used for hauling logs consisted of separate trucks equipped with log bunks. The ends of the logs are placed on a pair of these disconnected trucks and these loads connected up into trains. With light logs, the load is sometimes fastened to the bunk with chains, but in the fir district there is seldom anything to hold the trucks together but the weight of the logs on the bunk. Hand brakes are provided on each truck.

In order to permit the use of air brakes, these trucks are connected into skeleton cars 70 ft. or more in length by means of a center sill that carries the air cylinder and brake equipment. The common carrier railroads are also using some skeleton cars, but most of the logs that they haul are loaded on standard flats provided with log bunks on the deck. The western states all impose certain safety regulations for the construction and operation of logging railroads, but the requirements of these are not as stringent as those for common carrier roads and allow the operation of trains without air brakes.

Use Both Geared and Direct-Connected Locomotives

The power used for short hauls and switching is usually a geared locomotive. These machines are built in weights of from 40 to 90 tons, all of which is on the drivers. For longer hauls, a direct-connected locomotive is used, the most popular type being the Mikado. For service on heavy grades, these locomotives carry tanks for oil and water. The Mallet type is becoming popular and gives the advantage of a heavier unit with light wheel loads. The locomotive of this type in use in the woods are much lighter than those built for standard service and are frequently built with saddle tanks.

The fuel most favored is oil. The fire risk is much less with an oil-burning locomotive and this, with the saving in time and labor in handling fuel, justify its use, although the cost is higher than for coal or wood. Gasoline locomotives are built for light service but are seldom used for hauling logs. Some logs are being handled by electric lines, but no logging railroad has yet adopted electric power.

Methods of Train Operation Are Simple

Train length is usually limited to about 30 cars. The speed seldom exceeds 20 miles per hour with loads. But, due to the short hauls and the speed with which cars are loaded and unloaded, it is not unusual to have a record of daily car loading in excess of the number of cars in service. The service is very hard on the cars. The dropping of logs on the cars from the tongs, rough track and frequent derailments make car repairs a large element in cost of operation. This cost is much less with the log trucks and skeleton cars than it is with standard flats. Train dispatching is conducted by telephone and is usually very simple. In some operations, there is no

system that is worthy of the name, but there is usually a man who gives all or part of his time to keeping track of the location of the trains and who directs all train movements. Train crews are smaller than on common carrier roads and the labor cost of train operation is less.

All of these factors combine to make the operation of the logging railroads cheaper than that of common carriers. The rates on common carrier roads have recently been increased in the state of Washington to a point where many of the loggers feel that they can build and operate their own roads more cheaply than they can pay freight. This is resulting in the extension of some roads to the mills or tidewater.

The logging roads are being constantly extended into more remote territory as the timber is cut off. In the Pacific Coast district, there are more than 6,000 miles of logging railroads in operation and the total is increasing about five per cent a year at the present time. From 20 to 60 per cent of the track of a logging railroad consists of temporary spurs that are in use but a few months and then removed. This annual replacement of spurs probably amounts to more than 25 per cent of the total mileage. Thus the total mileage of railroad built annually amounts to about 2,000 miles.

The railroad cost is often as much as 40 per cent of the total logging cost and probably totals over $30,000,000 a year in the Pacific Coast district. Notwithstanding this, the economics of railway location as applied to logging railroads has received little scientific study. The problem is difficult, but the increasing magnitude of the industry justifies the expenditure of a large amount of effort in its solution. Accurate data covering every part of the cost of logging as well as of railroading are the first requisites of such a study.

The wide variation in natural conditions and operating methods makes it difficult to formulate rules, and the rapid progress in the development of new equipment and logging methods soon renders old data obsolete. The principles that will cover all conditions must be basic and will require time studies of many features of work.

Safety Washout Plug With Acme Threads

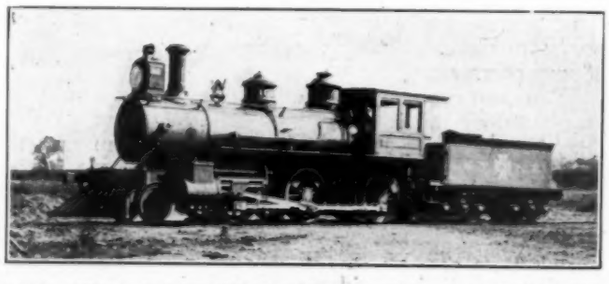
THE Housley Flue Connection Corporation, Indianapolis, Ind., has recently placed a safety type of washout and arch tube plugs on the market which represent a distinct departure from conventional design. The fundamental idea of the Housley plug is to provide a safe arrangement whereby the threads in the boiler sheets are protected from injury and at the same time allow better inspection and more thorough cleaning during the washout operation. This idea has been put into practice by making the plug in two parts—one part remaining permanently in the boiler sheet and the entire unit being made of forged steel.

The details of construction are plainly shown in the illustration. The sleeve or body of the plug is threaded with standard boiler threads for fitting into the sheet. The thread by which the cap is joined to the sleeve is known as the Acme thread, the pitch being nine threads per inch. The joint between the sleeve and cap is sealed by means of a graphited copper-asbestos gasket which fits tightly into a cavity in the cap and will not drop out when the cap is unscrewed. The dimensions of the plug and sleeve are such that the cap must be seated to a sufficient depth so that no threads will show, which is an indication that the cap is properly seated on the gasket.

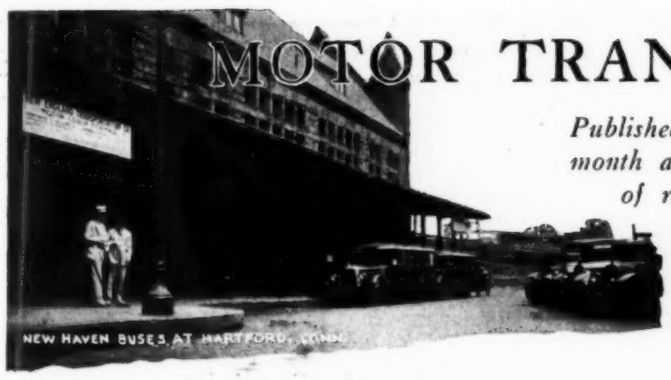
The method of applying the Housley washout plug is simple. The hole in the sheet is reamed and tapped according to the standards of the individual road. The sleeve of the plug is then screwed into the sheet until the fit is steam-tight, after which the inner edge is rolled over the sheet. The cap is then screwed down until the joint between the cap and sleeve is sealed by the copper-asbestos gasket. When the cap is seated, its threads are completely covered by the projecting lip of the sleeve. The sleeve is fastened doubly and permanently steam-tight in the sheet by rolling the thread-fit. The Acme thread connecting cap and sleeve has unusual strength and makes cross-threading of the cap and sleeve impossible. This thread, together with the copper gasket, makes the joint between sleeve and cap secure, yet the cap may be easily tightened or loosened.

When No Threads Are Visible on the Cap of This Plug it is an Indication that the Cap is Properly Seated on the Gasket

Larger holes and clear passages for free washing are other advantages. It will be noted that the holes through which washout nozzles are inserted have no threads so that the washout men can work the nozzles in all directions without the fear that they will damage the threads in the hole. The large openings through the 2⅞-in. plugs on the four corners of the mud-ring and in the barrel of the boiler allow a greater outflow of water which affords a faster and cleaner washout.



A New York & New England Locomotive at Cooke Works, Paterson, N. J., About 1890



MOTOR TRANSPORT SECTION

Published in the fourth issue of each month and devoted to the co-ordination of railway and highway service

Prepare for I. C. C. Bus and Truck Investigation

Railways, motor vehicle operators, manufacturers and shippers arrange for full representation

THE railways, motor bus and truck operators, manufacturers of highway transport equipment and organizations of shippers are making elaborate plans for participation in the investigation of the Interstate Commerce Commission concerning the operation of motor buses and motor trucks. The hearings, the first of which will open at the Great Northern hotel in Chicago on July 27 and which will be moved later to 12 other cities in all parts of the United States, are expected to be heavily attended and closely followed by many interests.

The first step in the commission's investigation was the distribution of a questionnaire to all Class I railways. This questionnaire, which was described in the *Railway Age* of June 19, page 1910, was designed to elicit complete information as to the present status of motor bus and motor truck operation in the United States. The information to be furnished includes a description of the motor bus and motor truck operations of the railways themselves, either in terminal or line service and either in competition with the railway's own lines, in competition with the lines of other railways, or in competition with no railways. Information as to the bus and truck operations of railways through subsidiaries or by other persons or individuals either in connection or in competition with railway lines is also required. The questionnaire also inquires as to the extent, if any, of motor bus and truck regulation by the state or municipal authorities in various territories covered by the railways. Some of the detailed questions asked regarding methods of motor vehicle operation concern the methods of publishing rates, fares or charges, the manner in which revenues and expenses of operation are included in the primary accounts, whether operations have been profitable or unprofitable, the advantages and disadvantages which experience has shown with respect to motor transportation, the nature, extent and effect of motor vehicle competition on the traffic and revenues of rail carriers, the extent of abandonment, if any, of rail lines because of such competition and what consideration, if any, the railways are giving to the establishment of additional service.

Replies to the questionnaire are required to be furnished to the commission not later than September 1. In the meantime, however, the commission will pursue its investigation by means of the 13 hearings which will consume the two months period from July 27 to September 29, when the last hearing will begin at Washington, D. C.

The railways have arranged to be represented as individuals at each point where hearings are held. The Association of Railway Executives will not take part officially in the hearings. It is anticipated that the replies to the questionnaire will constitute the major part of the presentation of the railways in the commission's investigation, but that these will be supplemented by detailed testimony at the various hearings.

Manufacturers to Participate

The manufacturers of motor transport equipment, through the National Automobile Chamber of Commerce, are organizing the independent operators of buses and trucks for the presentation of their case. The national committee appointed to take charge consists of A. J. Brosseau, president of Mack Trucks, Inc., who is chairman; Windsor T. White, chairman of the board of the White Company; Alexander Legge, president of the International Harvester Co.; John A. Ritchie, president of the Yellow Truck and Coach Manufacturing Co., and Alfred H. Swayne, vice-president of the General Motors Corporation. Edward F. Loomis, secretary of the national motor truck committee of the automobile chamber, is secretary of the committee.

Through the medium of letters addressed by the presidents of the manufacturing companies to their branch managers and dealers, followed up by visits from representatives of the national organizations, the officers of the local truck and bus associations and operators are being urged to prepare for complete presentation of their case. The suggestion has been made to the operators that they describe their own operations along the lines which the questionnaire sent to the railways indicates that the commission will be particularly interested in, particularly

regarding the place and nature of the service rendered and whether or not it is in competition with railways.

N. I. T. L. Interested

The National Industrial Traffic League, subsequent to a meeting of the Committee on Highway Transportation held in New York on July 9, has prepared a program of procedure at the hearings. Some members of the league at various points where the hearings are to be held have been asked to take the initiative in procuring witnesses from among the shippers. A letter from the executive secretary to all members urged that they cooperate with the member having charge of the presentation of the testimony at the point of hearing adjacent to them, advising what testimony they wish to give, if any.

The only position that the league is taking is that it favors a thorough investigation of motor truck transportation. The members who have been asked to take charge of the shippers' testimony have been urged to secure witnesses who will testify as to the advantages of motor truck service, whether or not there is any demand for regulation of common carrier motor truck operation, and other more detailed questions regarding motor truck service, particularly the use made of it by shippers, the reasons why trucks are used instead of rail carriers, the rates charged by trucks as compared with the rates of the railways, a comparison of the kind of service rendered by the two forms of transportation with respect to time, packing requirements and receiving hours, flexibility of motor service as compared with rail service, the character of receipts given by motor truck companies as compared with those of the railways, the distance as a rule that goods are shipped by motor truck, etc.

Local Organizations Involved

In addition to the interest shown by the national organizations, local associations and clubs are also showing keen interest in the commission's investigation and are taking steps to insure the participation of their members at the hearings. Typical of these is the bulletin of the transportation committee of the Chicago Association of Commerce, sent to all its members. This bulletin solicits the views of all receivers and shippers interested in the subject of motor truck operations. A questionnaire distributed asks the following questions of the members: Do you operate your own trucks? How many motor trucks do you hire? Are your operations interstate, intra-state or both? Do you hire the service of a common carrier by motor truck? Do you hire the service of a contract carrier by motor truck? What are the commodities hauled in these vehicles? Where are they hauled? What is the average length of haulage? Do you use the trucks instead of the rail lines? Why? What special service does the motor truck perform? Does it expedite deliveries? Is the cost of transportation service alone less than other methods? If more, why do you use it? What influence does it have upon your inventories and warehousing practices? Are your trucks under regulation? Is the present type of regulation satisfactory? Has the truck enabled you to extend your business into new territory? Is there a field for further expansion of the use of the motor truck? What influence has your use of motor trucks had upon rail operations into your territory? What has been your experience in settling loss and damage claims with motor truck companies? Has the financial responsibility of such companies proven satisfactory? Do you favor regulation by state or interstate commissions?

The Traffic Club of Chicago called an open forum meeting at the Hotel LaSalle, Thursday, July 22. In order that the members of the club could hear the subject discussed from the viewpoints of the various interests affected, the Public Affairs committee secured three speakers to represent the interests of the carriers, truck manufacturers and the shippers. These speakers were T. C. Powell, president of the Chicago & Eastern Illinois; A. E. McKinstry, vice-president of the International Harvester Company; and J. P. Haynes, traffic director of the Chicago Association of Commerce.

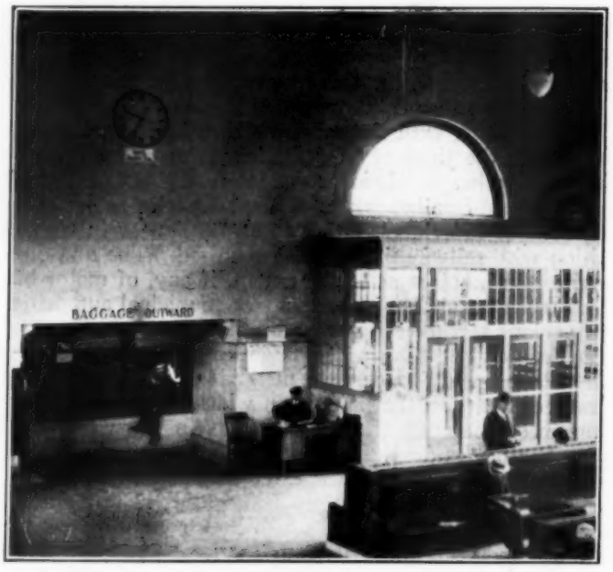
Pennsylvania Secures Its First Bus Permit

THE Public Service Commission of Pennsylvania has granted to F. J. Scarr, supervisor of motor service of the Pennsylvania Railroad, a certificate of public convenience and necessity authorizing the operation of motor buses on a 12-mile route from Chambersburg, Pa., to Piney Mountain Inn, as was briefly noted in last week's *Railway Age*. The application by Mr. Scarr was made in behalf of the Pennsylvania General Transit Company, the railroad's motor transport subsidiary.

Operation on this route, the first to be authorized for a steam railroad in Pennsylvania, will replace an electric line, a subsidiary of the railroad, which now operates over a portion of the route. Five buses (three 21-passenger and two 29-passenger) will be required for this service and orders for them have been placed.

Mr. Scarr's application was opposed by an independent bus operator, who serves a part of the authorized route, but his contentions were not allowed. Two other applications by Mr. Scarr for bus operations by the railroad's subsidiary are still pending before the commission.

THE PUBLIC SERVICE COMMISSION of Pennsylvania has approved the application of the Reading Transportation Company for a charter. This company is the Reading Railway's highway motor transport subsidiary. The company's application for authority to operate buses on a considerable route mileage is still pending before the commission.



New Haven Station, Hartford, Conn.—Bus Line Representative at Desk

Three Yellow Type Z Coaches Are in Service on the Tracy City Branch

Buses Replace Trains on N. C. & St. L. Branch

Eight passenger trains eliminated and substitute service furnished by buses for passengers and trucks for mail, baggage and express

PASSENGER train service on the Tracy City branch of the Nashville, Chattanooga & St. Louis was replaced by motor bus and truck service on June 14. The highway operation is carried on by the Nashville, Chattanooga & St. Louis Motor Transit Company, a subsidiary of the railway. The buses make four

Steep Hills Are Negotiated with Ease by These Six-Cylinder Buses

round trips daily between Tracy City, Tenn., and Cowan, a distance of 20 miles, with two of the trips extending on to Coalmont, 6 miles farther. The buses make connections at Cowan with all main line passenger trains between Nashville and Chattanooga which stop there during the daylight hours.

It will be noted on the map of the Tracy City branch that the highway over which the N. C. & St. L. buses operate parallels the railway line very closely for the entire distance and touches all towns on the branch. The highway is hard surfaced for the entire length of the bus route, buses following the Dixie highway between Cowan and Fairmont, and the Monteagle-to-McMinnville road from Fairmont to Coalmont. The distance between Cowan and Coalmont, via the highway, is approximately the same as that by railway, what difference there is being in favor of the highway.

Equipment

The equipment owned by the N. C. & St. L. Motor Transit Co. consists of three 29-passenger, type "Z" Yellow coaches, and two trucks for the handling of mail, baggage and express matter, which are mounted on type "Z" Yellow chassis. All of these were manufactured by the Yellow Truck & Coach Manufacturing Co., Chicago. The Yellow type "Z" chassis has a six-cylinder sleeve valve engine and the bodies are equipped with leather-upholstered coach type seats. Of the bus equipment, one bus is normally in service throughout the day, one usually makes one round trip daily on the heaviest trip, and one is held in reserve. Of the two trucks, one is normally in service and the other in reserve.

The schedules on which the buses are operated approximate closely those of the trains replaced, although the running time of the buses between Cowan and Tracy City and Coalmont is approximately 20 min. slower than that of the trains. A train which left Cowan at 8:05 a.m. arriving at Coalmont at 9:25 a.m. was replaced by a bus leaving Cowan at 7:40 a.m. and arriving at Coalmont at 9:25 a.m. A train which left Cowan at 12:05 p.m. arriving at Coalmont at 1:25 p.m., was replaced by a bus leaving Cowan at 11:50 a.m. and arriving at Coalmont at 1:35 p.m. Trains leaving Cowan at 4:00 p.m.

and 6:35 p.m. arriving at Tracy City at 5:00 p.m. and 7:35 p.m. respectively were replaced by buses leaving Cowan at 3:40 p.m. and 6:35 p.m., arriving at Tracy City at 5:00 p.m. and 7:55 p.m. respectively. Similar schedules are maintained in the opposite direction. Trucks carrying mail, baggage and express follow the same schedule as the buses.

Operating headquarters of the Motor Transit Company are maintained at Tracy City, where an old enginehouse has been converted into a garage. The motor operations are under the supervision of F. W. Kelsey, superintendent of the Chattanooga division of the railroad and also of the Motor Transit Company.

The bus line is notable for the heavy grades encountered, Cowan lying at an elevation of 871 ft., Sewanee at an elevation of 1860 ft., Monteagle, 1922 ft., and Tracy City and Coalmont, about 1900 ft. The abrupt rise between Cowan and Sewanee is negotiated without difficulty by the motor equipment.

Reasons for Installing Bus Service

In supporting the application of the N. C. & St. L. before the Railroad and Public Utilities Commission of Tennessee to discontinue passenger trains on its Tracy City branch and substitute buses for them, W. R. Cole, then president of the N. C. & St. L., and now president of the Louisville & Nashville, submitted a statement showing the heavy losses sustained for years in maintaining branch and local passenger service; admitting the fact the public, by its patronage has shown a preference for riding on the highways instead of on the railroads; and announcing that the company planned to furnish this sort of transportation wherever the conditions required and to justify it with the dependability guarantee of the railroad behind it.

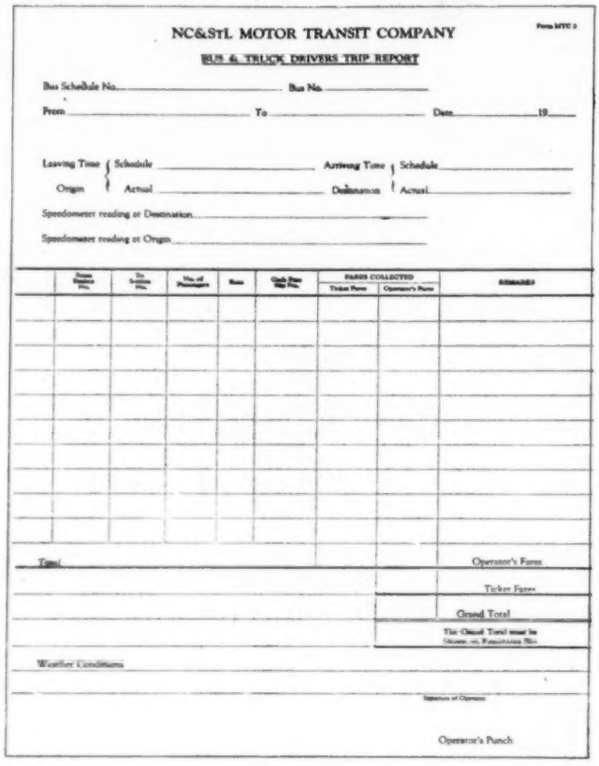
The petition showed that the use of automobiles, both as common carriers and private conveyances, has been increasing steadily. Almost all of this travel would have been handled by the railroad if it had not been for the automobile, the petition said. The number of automobiles in Tennessee in 1919 was 80,422, and in 1925 it was 207,349.

The Tracy City branch of the N. C. & St. L. has been losing money for several years. The losses for the last six years are as follows:

Year	Losses	Year	Losses
1925	$219,444	1922	$189,065
1924	249,312	1921	164,034
1923	208,265	1920	278,638

The average receipts from all pay passengers on each of the four trains operated in each direction on the branch line daily were about $8. The out-of-pocket operating cost of this passenger service, exclusive of general expenses and maintenance of way expenses, was $42,630 in 1925, the gross passenger fares in such service in that year being only $23,922.

The N. C. & St. L. estimates that by substituting bus service for train service an annual saving of about $21,000 will be made. The rates of fare will be the same as on the railway and the usual baggage, express and mail service is provided. Through passengers with destinations on the Tracy City branch are able to buy through tickets at their starting point good for transportation first by rail and then by bus, and no rechecking of baggage is required. In other words, the substitution of buses for trains on the branch has effected no change whatever in the service rendered the patrons.



NC&StL MOTOR TRANSIT COMPANY

BUS & TRUCK DRIVERS TRIP REPORT

Bus Schedule No. _____ Bus No. _____

From _____ To _____ Date _____ 19__

Leaving Time Origin { Schedule _____ Actual _____ Arriving Time Destination { Schedule _____ Actual _____

Speedometer reading at Destination _____

Speedometer reading at Origin _____

	Passes Number Nos.	To Station Nos.	No. of Passengers	Rate	Cash Fare Nos.	FARES COLLECTED Ticket Fares	FARES COLLECTED Operator's Fares	REMARKS
Time								Operator's Fares
								Ticket Fares
								Grand Total
								The Grand Total must be Same as Passengers Nos.

Weather Conditions _____

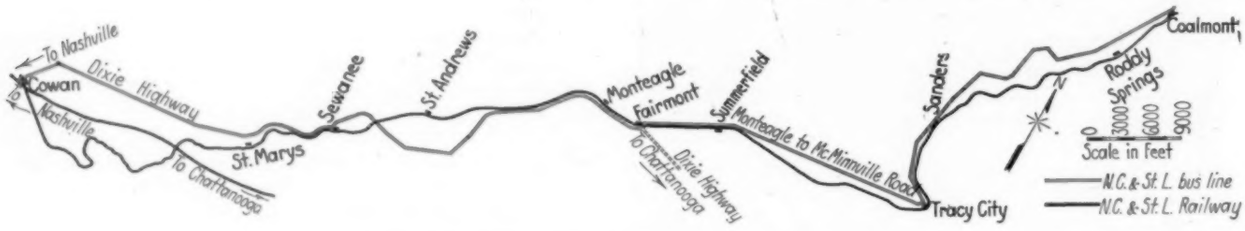
Signature of Operator _____

Operator's Punch

Circular No. 1 of the Motor Transit Company describes in detail the plan of operation, which is followed by the bus line. It is quoted extensively below:

Motor bus and truck operators, as well as other employees, will be required to make certain records and reports and perform such other service as specified, and in accordance with the rules and instructions herein provided.

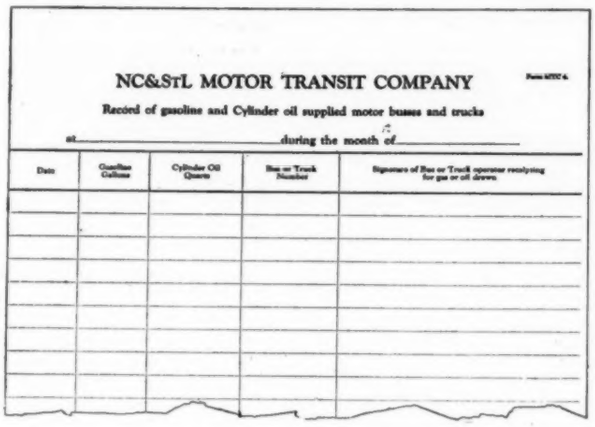
The ticket and baggage agents on the Tracy City branch will continue to handle the ticket and baggage business as at present. Reports shall be rendered monthly as usual. Each employee shall be required to make semi-monthly reports of time earned, using time



The N. C. & St. L. Bus Line in Relation to Its Rail Line

return ticket form, these to be forwarded to the comptroller at Nashville, on the first train after the close of the last day of both the first and second periods of each month, i. e., the first period to close with the fifteenth of the month and the second period to close with the last day of the month.

For every change of tire, whether for renewal or repairs, a special tire report form shall be made in duplicate by the bus or truck operator, the original to be forwarded to the comptroller at Nashville and a duplicate sent to the superintendent at Chattanooga at the close of the same day the tire change is made. Together with other information shown on this form, an accurate



NC&StL MOTOR TRANSIT COMPANY

Record of gasoline and Cylinder oil supplied motor busses and trucks

at _____ during the month of _____

Date	Gasoline Gallons	Cylinder Oil Quarts	Bus or Truck Number	Signature of Bus or Truck operator receiving for gas or oil drawn

record shall be made of the speedometer reading at the time of tire removal, and of the correct serial numbers shown for each tire removed and each tire installed, giving reasons for change and whether tire is to be repaired or scrapped. Under the remarks column, is stated the point along the route at which the tire change became necessary.

All accessories, including tires, tubes, etc. (except gasoline and motor cylinder oils) for bus and truck operations, shall be obtained by the operator by the use of the requisition form made in duplicate and signed by the bus or truck operator, the original to be left with the proper party at the authorized supply point, the duplicate to be forwarded to the comptroller at Nashville. In the event of emergency repairs or other service, this requisition form shall be used as in the case of supplies, etc., but when such emergency service is performed, the operator shall obtain, at that time, a bill or statement in duplicate from the party furnishing repairs or service, indicating both the amount of the bill and the details of service or repairs furnished. This invoice or bill shall be turned over to the foreman at the regular repair point and, if found to be correct, the foreman will endorse his approval thereon and forward same to Nashville for voucher.

All cup greases, Alemite service, differential, and transmission greases and oils, and other such lubricants used in servicing cars from time to time shall be secured by the use of shop-work requisition forms indicating thereon quantities and kinds (showing the amount of labor used and the bus or truck numbers to which furnished), the original requisition to be forwarded to the comptroller at Nashville at the close of the month and a copy retained for file.

Gasoline and motor cylinder oils will be supplied to buses and trucks at the regular supply point at Tracy City.

The foreman or mechanic in charge there will meter gasoline and motor oils for bus and truck use on the verbal request of operators. The foreman shall keep a record indicating the quantities of gas or oils issued, showing the bus or truck number and the date furnished, and in the space provided, receipt therefor shall be acknowledged by the signature of the operator, the original of this form to be sent to the comptroller at the close of the last day of each month and the copy retained for file.

Gasoline or oils used for air compressor or other shop machinery shall be obtained by the use of a shop work requisition form, indicating thereon the use for which issued.

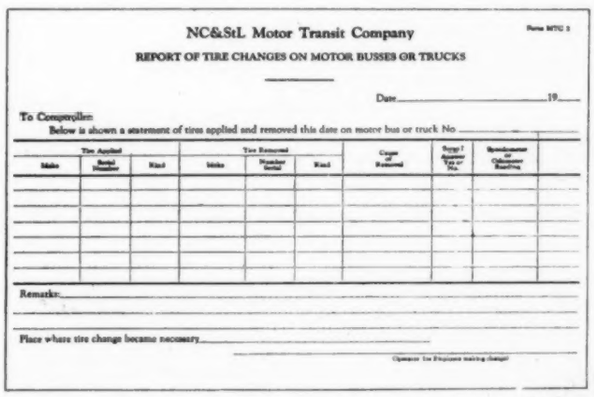
Repairs

Repairs, except in emergencies, when determined to be necessary, shall be made at the regular Motor Transit Company's repair points. For all materials used in repairs at such repair points, a shopwork requisition form shall be used to obtain materials from stock room. This form also provides space thereon in which shall be shown such labor as is used in connection with making the repairs, and will represent the basis of statistical distribution of such charges as well as to serve as a record of stock issues.

The mechanic or other party in charge at the supply point shall keep a stock record in which entries shall be made showing all receipts and issues of material, to be arranged by units or classes as may be found appropriate and to permit of locating probable differences which may develop in inventories.

In the case of any character of accident, personal injury, wreck, damage to property or stock, etc., the operator shall immediately make a telegraphic report to the superintendent at Chattanooga, promptly followed by a letter report, giving all facts in connection therewith.

Bus operators shall deposit daily cash collections at the close of each day with the N. C. & St. L. agent at Cowan, or Tracy City, as may be most convenient, using a remittance slip form in duplicate for this purpose, the original to be submitted with the deposit and the duplicate to be forwarded to the treasurer at Nashville.



NC&StL Motor Transit Company

REPORT OF TIRE CHANGES ON MOTOR BUSSES OR TRUCKS

Date _____ 19__

To Comptroller:

Below is shown a statement of tires applied and removed this date on motor bus or truck No. _____

Tire Applied			Tire Removed					
Make	Serial Number	Kind	Make	Number Serial	Kind	Cause of Removal	Buyer's Assigned No. or No.	Speedometer or Odometer Reading

Remarks: _____

Place where tire change became necessary _____

(Operator or Employee making change)

The railway agents receiving such deposits shall give bus operators proper receipts therefor. Such deposits shall then be remitted by the railway agents to the Fourth & First National Bank at Nashville, for the account of the N. C. & St. L. Ry., and for the specific bus operators who made the deposits. These remittances are to be accompanied by the original remittance slips which were left with the railway agent at the time bus operator's deposits were made. This plan merely enables the actual remittance to the bank to be made by the railway agent

instead of by the bus operator. The N. C. & St. L. treasurer shall then enter these remittances, when reported by the bank, to the credit of the N. C. & St. L. Motor Transit Company, showing the name of the individual to whom the credit belongs.

All ticket agents shall continue to sell tickets, and baggage agents shall check baggage, to and from points on the bus line as formerly. All local tickets, excepting commutation tickets, are provided with train coupons, one of which shall be lifted by the bus operator when the destination of the ticket is beyond the run of the bus operator.

Commutation tickets, when sold to a point beyond the bus line, shall be honored but not lifted and a dummy check form must be used for making a record of the transportation to the terminal points. Scrip-coupons must be lifted for the transportation on the bus line. No scrip shall be lifted by the bus operator for a point beyond his run. All passes honored but not lifted must be listed on the pass report form.

Cash fares shall be collected from passengers who are not provided with tickets. No cash fare shall be collected to a point beyond the bus terminal. A cash fare receipt must be issued for each passenger paying cash fare, and reported in numerical order on the operator's trip report. If a cash fare receipt is voided for any reason it must be so reported and both parts of the receipt inclosed with the report. Passengers should be required to purchase tickets where tickets are on sale, as bus rates from stations open for ticket sales are higher than the ticket rate.

Interline tickets honored but not lifted must be listed in space provided therefor on dummy check form. Interline tickets destined to a point on the bus line must be lifted. All tickets lifted, including train coupons, scrip, passes, cash fare receipts and report, together with dummy check form and pass report form, must be enclosed with the operator's trip report form.

For cash fare collections, each passenger shall be furnished with a receipt by the use of a receipt form, the stub to be retained by the bus operator and reported with cash collections.

In addition to this form being used as a trip report of cash and ticket collections, its use is to embrace the reporting of other essential data covering the trip operations, such as delays in time schedules, weather conditions, bus and truck mileage as indicated by speedometer readings, number of passengers carried, passenger miles, etc. Cash fare stubs shall be listed on this form, showing all the information as provided for in the several columnar headings.

All cash fare stubs, all tickets lifted, dummies form representing tickets honored but not lifted, passes and pass report, and scrip collections, shall be securely attached to these reports, enclosed in envelope and forwarded to the comptroller at Nashville immediately after the close of each day.

It is to be remembered that a separate report on this form shall be made for each one way or trip schedule, and that all stubs, ticket collections, etc., shall be attached to their individual report, and that these accumulated reports for each day shall be enclosed and sent to comptroller at Nashville in one envelope immediately after the close of each day. A carbon copy of these trip reports shall be sent to the superintendent at Chattanooga.

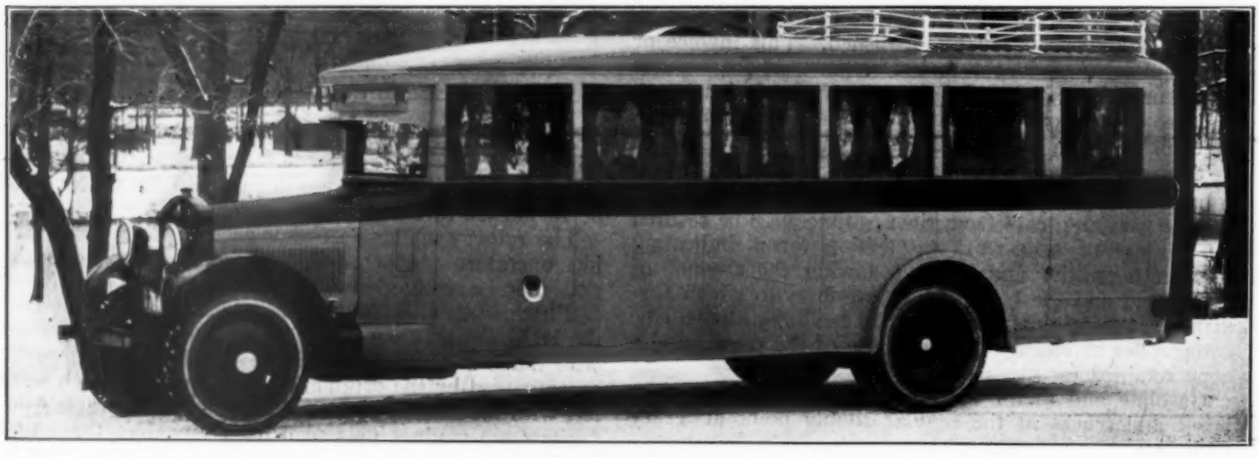
At regular agency points, baggage will be checked and housed, agents being required to check baggage and to make all baggage reports as at present without change. For baggage from non-agency points destined to regular agency points the bus operator will be required to issue a duplex check, the passenger being given the receipt portion and the check portion to be attached to the baggage which shall represent authority to the truck operator to move the baggage as indicated by check. The truck operator shall not move baggage unless properly checked.

For each piece of baggage received for transportation, at non-agency points, a book-record form shall be made by the truck operator indicating the check numbers, description (whether bag, trunk, suitcase, etc.), point at which received, and destination.

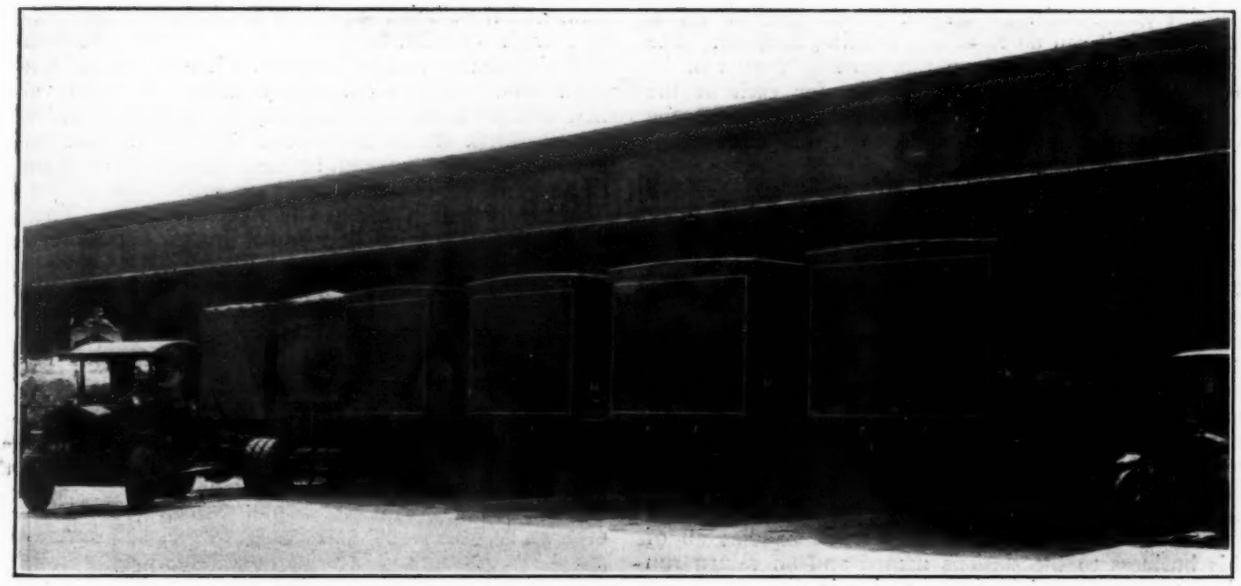
Since the passenger bus precedes the truck and the truck follows in the immediate wake of the bus, it will be required that passengers surrender their baggage receipts to the truck operator before baggage will be set off at non-agency points, otherwise the truck operator shall put the baggage off at the next regular agency station beyond.

For express, the truck operator shall be required to keep a record of express received and delivered, and otherwise meet the requirements according to the instructions as issued by the express company.

Mail shall be handled by the truck operator according to instructions issued by superintendent, and reports made to the general manager and superintendent, and in accordance with the instructions printed on this form. Baggage, milk, mail and express will be handled by trucks assigned to this specific service.



A Reo Chair Type Bus

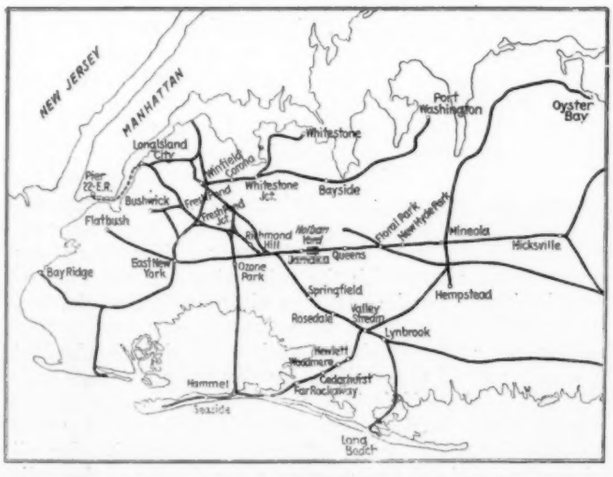


Tractor and Six Trailers at Pier 22 East River

Long Island Uses Motor Vehicles to Reduce Congestion

Tractors and trailers used to concentrate shipments in metropolitan area—Trucks for way freight

THE Long Island has reduced congestion on some of its lines of heavy traffic density, eliminated car floating and saved yard operations by the substitution of tractor and trailer service for certain move-



Western Section of Long Island Where Motor Trucks Are Used in Freight Service

ments by rail and car float in the metropolitan area and by the use of motor trucks to handle l.c.l. business on several of its branch lines. At the same time a considerable improvement in service to shippers has been effected. Vehicles in this service are supplied and operated under contract by the Motor Haulage Company.

Concentration of Shipments at Specific Terminals

The railroad has four metropolitan terminals, viz., Pier 22 East river, in New York, and Flatbush avenue, Bushwick and Long Island City on Long Island. Formerly it was the practice for each of these stations to make peddler cars for each of the railroad's various branches daily. This involved light loading of cars and meant that every local train on the railroad had to handle four peddler cars, one from each metropolitan station, on every train.

Motor service was instituted to permit the consolidation of this freight at specific stations, so that more through cars could be made and peddler cars on each train reduced to a minimum.

Under the present arrangements Flatbush avenue handles all freight for stations east of Jamaica. Bushwick handles all cars for the Oyster Bay branch and makes some solid cars for stations east of Jamaica and the Manhattan Beach division. The Long Island City station dispatches all freight for the North Side division. No cars are loaded at all at the present time at Pier 22, East river. All freight delivered by shippers at this station for destinations on Long Island is handled by highway to one of the three concentration points across the river. Likewise all westbound freight destined for this station moves from one of the other terminals by tractor and trailer.

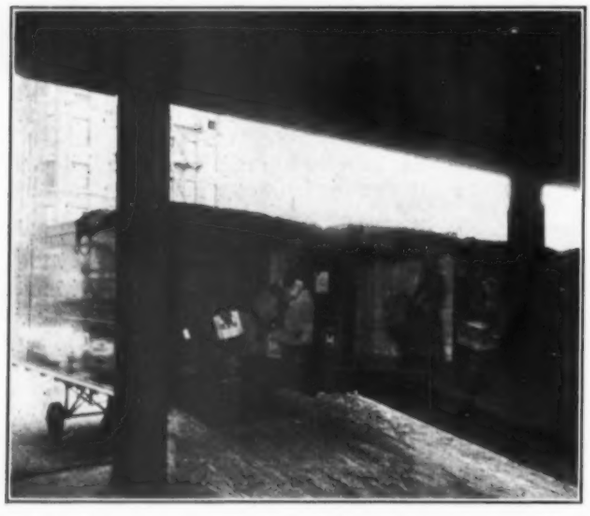
The Long Island classifies all its freight destined to points east of Jamaica at Holban yard, situated between

Hillside and Hollis. With the present facilities, this yard has all it can do to handle existing business. The additional burden placed on this yard by reason of its having to handle four peddler cars for each of the branches of the railroad was considerable—since the majority of the trains are made up at this yard.

Three Line Haul Operations

In addition to the concentration of freight, the Long Island has three line haul trucking operations. The concentration work is known as Unit No. 1. Unit No. 2 comprises the motor trucking service for handling l.c.l. between Long Island City, Port Washington and Whitestone. There are two motor trucks in this service. One of them works only between Long Island City, Corona and Winfield, where several trips a day are necessary to handle the business. The other truck starts out from Long Island City, sometimes light and sometimes with a load for Corona or Winfield, and proceeds to Bayside, where a car made up of shipments for points between Bayside, Port Washington and Whitestone is awaiting it. This truck handles all of this business to the stations named and on return run picks up westbound business, which is dispatched that evening in cars from Long Island City.

Unit No. 3 consists of one truck, which operates out of Valley Stream. Freight for this zone is concentrated at Bushwick station and dispatched by car to Valley Stream, where the contents are loaded into the truck for delivery at local stations. This truck first handles loads for Rosedale, Springfield, Queens, Floral Park and New Hyde Park, where it also picks up westbound

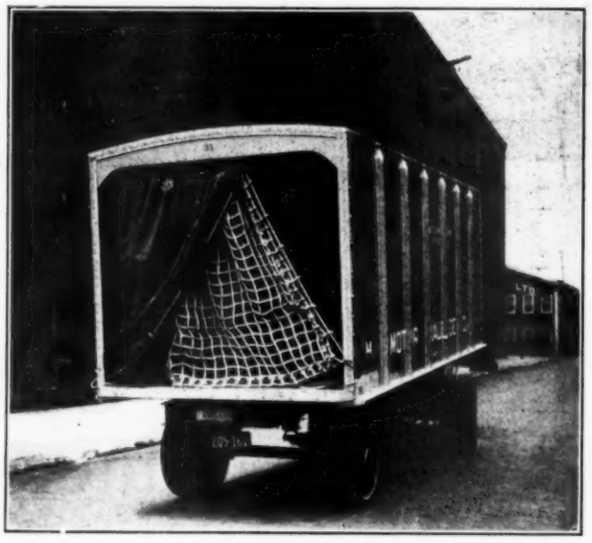


Trailers Are Loaded to Full Cubical Capacity and Move Under Seal

freight, and then proceeds back to Valley Stream. Following this it takes loads for the Far Rockaway branch, returning with westbound loads. A car loaded with freight picked up by this truck is made at Valley Stream for Bushwick station daily.

Unit No. 4 consists of one truck, which operates on the Oyster Bay branch from Mineola-Garden City to Oyster Bay. Loads for this territory are concentrated at Bushwick station in a car which is sent to Mineola-Garden City by train, where the freight is loaded onto the truck and deliveries at local stations made. This truck likewise picks up westbound shipments, which it leaves at Mineola for shipment by rail.

Unit No. 1, in addition to the consolidation of shipments and the elimination of car floating across the East river from Pier 22, also has a line haul service from Bushwick station to East New York, Fresh Pond, Richmond Hill, Ozone Park and Jamaica. Formerly all these stations made a car each day for Bushwick station, and Bushwick station a car each day for all these stations. These cars were all handled through Holban and Fresh Pond yards before reaching break bulk point—often resulting in a delay of two or three days. There is quite a good deal of westbound freight in this territory which used to be delayed considerably before it left Long Island. Now it is handled by tractor and



An Aluminum Body Trailer in Long Island Service

trailer to Bushwick station, where it is sent out the same day that it is received.

Tractors and Trailers Used in Concentration Service

The concentration service performed by Unit No. 1 is handled entirely by tractors and trailers. There are 29 Lapeer 10-ton trailers in this service, and six Pierce-Arrow tractors. The trailers have closed bodies, 20 ft. long, 8 ft. wide, and 6 ft. high, and the practice is to load them to the limit of their cubical capacity. The four trucks used by Units 2, 3 and 4 are five-ton Pierce-Arrows with canvas covers.

Trailers are loaded and unloaded by the railroad company and are moved under seal the same as a freight car. When a trailer is loaded a manifest (four copies) is made up, covering all the shipments. The agent retains one copy and sends another to the supervisor of motor truck service at Flatbush avenue. Two are given to the driver along with the original waybills. One of these he keeps for the Haulage Company's records, and the other is turned over with the waybills to the railroad's agent at the receiving station. Freight is checked into and out of the trailers by the railroad, the same as would be done if freight cars were involved.

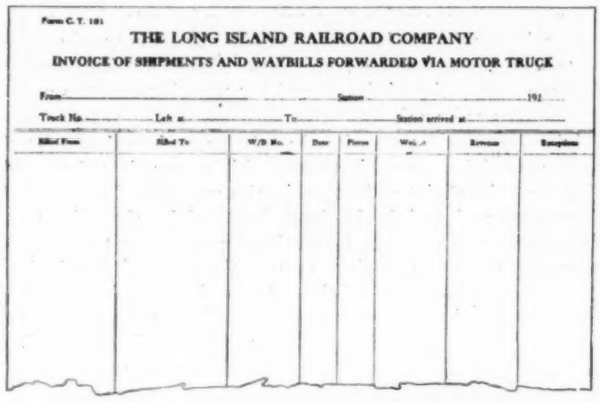
In the line haul operations freight does not move under seal, but the truck driver signs a receipt for all shipments received and secures a receipt from the railroad when the shipment is turned over to it.

Haulage Company Paid on Rental Basis Plus Mileage

Approximately 300 tons of freight are handled daily by Unit No. 1. The average haul in this service is about four miles, all of which is under conditions of

very heavy, congested city traffic. The railroad pays the Haulage Company on a basis of so much a day for each vehicle for a certain minimum mileage. When the mileage made by vehicles exceeds this minimum, there is a graduated increment in the payment. The Haulage Company's employees handle the vehicles, there being a driver and a helper on each truck and a driver for each tractor. The Haulage Company has two supervisors who are directly in charge of its service for the Long Island Railroad. One of these works with Unit No. 1 and the other with the activities of Units 2, 3 and 4.

The Motor Haulage Company has extensive garage facilities in Brooklyn and lesser establishments in New York. It aims to keep all of its equipment in a high state of efficiency and appearance, and to this end has extensive repair and painting facilities at its Brooklyn garage. Tractors and trucks go to these garages every night, where they are cleaned, inspected, given minor repairs and provided with gasoline and lubricants. The trailers are left at the Long Island stations overnight and are pulled into the garages only in case they need repairs. However, one of the company's employees



Form C. T. 101

THE LONG ISLAND RAILROAD COMPANY

INVOICE OF SHIPMENTS AND WAYBILLS FORWARDED VIA MOTOR TRUCK

From _____ Station _____ 192

Truck No. _____ Left at _____ To _____ Station arrived at _____

Billed From	Billed To	W/B No.	Date	Pieces	Wgt.	Revenue	Exceptions

The Railroad in Loading Truck or Trailer Makes Four Copies of This Manifest

makes the rounds each day to inspect the trailer equipment and keep it lubricated.

Benefits of Use of Trucks

The Long Island has no direct measure of the savings which motor vehicle operation is making for it, since no trains have been taken out of service thereby. But the total, however, hard it may be to arrive at a definite figure, is certainly considerable. There is the saving in floating cars across the East river; the reduction in the number of cars which have to be handled from the terminal stations to Holban yard and vice-versa; the saving in yard operation at Holban; and the reduction of delays to trains en route by reason of fewer way cars to be opened at each station. The facilities of the Long Island Railroad in the western end of Long Island are taxed to the limit by the road's passenger train operations, and every move which can be made to reduce the amount of line occupancy by unremunerative or slightly remunerative freight service is of the utmost importance. It is here that the motor truck service has proved its value, although it is also recognized that at the present time, if the railroad should go back to the old method of handling freight, it would probably be necessary to use the services of several more train crews than are now required.

The road's business is growing steadily and it is thought not unlikely that its use of motor vehicles as a substitute for rail freight service may increase.

Motor Transport Meeting at Providence, Aug. 26-28

A MEETING of the committee appointed by the executives of designated railroads in accordance with the action taken at the meeting of railroad motor transport officers, held in Atlantic City on June 11, for the purpose of arranging for another meeting to be held in or around Providence, R. I., and to consider the matter of forming a permanent organization to study the general subject of the relation of motor transportation to steam carriers, was held in Chicago on July 7, at the Union League Club.

The following railroads were represented:

Atchison, Topeka & Santa Fe—G. W. Lupton, assistant to vice-president;
Chicago, Burlington & Quincy—F. L. Johnson, assistant to vice-president;
Chicago & Eastern Illinois—W. H. Lyford, vice-president and general counsel;
Chicago Great Western—R. A. Bishop, general passenger agent;
Chicago & North Western—R. M. Van Doren, vice-president and general counsel;
Chesapeake & Ohio—C. S. Lake, assistant to president;
Denver & Rio Grande Western—J. L. Hohl, general agent;
Erie—W. L. Campbell, assistant to vice-president;
Missouri Pacific—J. G. Drew, vice-president;
New York, New Haven & Hartford—R. H. Newcomb, assistant to vice-president, representing A. P. Russell, vice-president;
Pennsylvania—F. J. Scarr, supervisor motor service;
Reading—E. D. Osterhout, passenger traffic manager;
Seaboard Air Line—N. D. Ballantine, assistant to president.

To Study New Haven and B. & M. Operations

The general discussion affirmed the decision made at the Atlantic City meeting to assemble in New England for the purpose of reviewing the progress made by the Boston & Maine and the New York, New Haven & Hartford in solving the problem of highway-rail coordination, and this meeting was set for August 26, 27 and 28, and is to be held in Providence. To insure freedom of discussion at this meeting, attendance will be confined to railroad officers who have been designated in advance by the carriers they represent.

"Railroad Motor Transport Conference"

A sub-committee was appointed to draw up a plan of permanent organization. It was agreed that the organization should be known as "Railroad Motor Transport Conference." The conference will have as its object the establishment of a clearing house for thought and development in this field and will be composed of railroad officers interested in the development of motor transportation by railroads, whether passenger or freight. It will study the problems raised by motor transportation, generally and specifically, to determine the fundamental principles involved.

Any Class I railroad of the United States or Canada may be represented in the meetings of the conference by as many of its officers as it sees fit to designate, and any highway subsidiary of any Class I railroad shall also be entitled to representation.

It is expected that sub-committees will be formed to consider the use of the motor coach, the motor truck and the rail-motor car by steam railroads and there may be a legal committee to study and report upon this phase of highway operation by rail carriers.

Headquarters of the conference will be established at Chicago, as the city most easily accessible to the members.

A tentative program for the Providence meeting was

offered and accepted. Briefly, the program will be as follows:

THURSDAY, AUGUST 26

(D. L.S.)

9:00 a.m. Registration of members.

10:00 a.m. Morning session—Presentation of N. Y., N. H. & H. railhighway co-ordination to date.

1:00 p.m. Luncheon.

2:30 p.m. Afternoon session—Study of practical side of N. Y., N. H. & H. plan, covering operating, maintenance, accounting and co-ordination problems.

7:00 p.m. Dinner—Followed by addresses by prominent speakers.

FRIDAY, AUGUST 27

9:00 a.m. Morning session—Devoted entirely to inspection of bus operation, including garaging, accounting, etc., in and around Providence.

1:00 p.m. Luncheon.

2:30 p.m. Afternoon session—Transportation by motor coach to Worcester and possibly Fitchburg to inspect practical co-ordination of rail and highway facilities.

7:00 p.m. Dinner—To be followed by session to act upon report of Committee on Permanent Organization.

SATURDAY, AUGUST 28

9:00 a.m. Morning session—Motor coach transportation to Boston, to review, at that point, activities of Boston & Maine Transportation Company.

Arrangements to inspect the truck operations of the Erie and New York Central in New York, and possibly the Pennsylvania's trucking operations in and about Trenton for such officers as wish to cover this phase are pending.

Bus or Train?*

By C. H. Markham
President, Illinois Central

THE Illinois Central does not assume an attitude of general antagonism to all motor vehicle common carrier transportation. On the contrary, we are disposed to encourage its development wherever there is real need for the service performed. However, we do take the position that where existing railway service is adequate for all reasonable requirements, motor vehicle common carriers should not be permitted to operate to the detriment of the railroads.

There is an extensive field in which the operation of motor vehicle common carriers is justified as an advantage to the public. But this field is chiefly in extending and supplementing railway service, rather than in competing with it. For example, motor vehicle common carriers can perform a valuable service to the public by affording transportation facilities in regions where traffic conditions would not justify the expense of railway construction and operation. They also can function to advantage as feeders of the railroads by operating laterally from railway points into adjacent territory, thus extending the areas that enjoy convenient access to rail facilities. In both these ways the services of motor vehicle common carriers are of benefit to the public and at the same time assist rather than injure the railroads.

Another field of usefulness for motor vehicle common carriers is in furnishing transportation service between points served by railroads, but so situated that motor vehicles can afford more direct and more convenient service. In cases of this kind there is some conflict with railway service, but the benefits to the public in improved transportation outweigh any objection that might be based upon loss of traffic by the railroads.

The Illinois Central recognizes the propriety of allowing motor vehicle common carrier lines to perform services such as I have just mentioned. Our opposition is directed exclusively against lines that propose only to duplicate or replace service already being performed satisfactorily by the railroads. In my opinion, there is no justification for the operation of motor vehicle common carrier service which parallels and competes with a railroad unless it is clearly shown that the service performed by the railroad fails to meet the reasonable requirements of the public or that these requirements can be met more economically by motor vehicles. If either of these conditions is shown to exist, the operation of motor vehicle service clearly would be to the advantage of the public and ought then to be permitted. The right of the public to enjoy the best transportation service that can be afforded is the paramount consideration.

But unless there is conclusive evidence that the railway service offered is inadequate or uneconomical in comparison, the railroads are justly entitled to enjoy the fruits of their efforts to build up their territory, and their revenues should be safeguarded from the inroads caused by the unnecessary and injurious competition of motor vehicle common carriers. There is only a certain amount of local traffic, passenger and freight, to be handled along the lines of a railroad. The entrance of the motor vehicle carriers into this field of transportation does not produce any additional local traffic; neither does it sow the seeds of enterprise that make for industrial or agricultural growth. The motor vehicle lines come in only to take a share of the traffic that already exists, traffic that was created and developed largely through the services of the railroad.

The increased use of privately owned and operated motor vehicles over improved highways has brought about a substantial reduction in the volume of short haul passenger and freight business handled by the railroads. Present revenues from many local passenger trains, for example, are not sufficient to pay the cost of furnishing the service, and many of these trains have had to be discontinued entirely because of the lack of patronage. If the railroads are required to share the remaining portion of their local traffic with motor vehicle common carrier lines which parallel their tracks, a further reduction in their revenues inevitably will result, bringing about further curtailments in local train service.

In opposing the establishment of motor vehicle common carrier lines which would parallel our rails, we believe that we are protecting the interests of our patrons as well as the interests of the Illinois Central. We do not intend to relinquish willingly any part of our passenger or freight service. We realize that the abandonment of local passenger trains, for example, means a definite loss in prestige and convenience for the communities formerly served. The local passenger train offers a dependable all-weather service for the transportation of passengers. By the conjunction between its service and the service of through trains, it enables passengers traveling to distant points to purchase tickets and check baggage direct to their destinations. It also provides facilities for the conveyance of mail, express and baggage, including newspapers. These services can be replaced only in part by the services of motor vehicle carriers.

The people of every community where motor vehicle service is proposed in competition with the railroads would do well to study the situation thoroughly to ascertain which of these forms of transportation is the better equipped to furnish the dependable, efficient, well-rounded service they require. Then they will be in a position to lend active and well-informed support to the transportation agency which they decide is better adapted to their needs. It is doubtful if traffic conditions justify the full operation of competing train service and motor vehicle service in any but exceptional cases.

*From an open letter by Mr. Markham to R. E. Addkison, president Addkison Hardware Company, Jackson, Miss.

General News Department

The sixteenth meeting of the Northwest Shippers Advisory Board will be held at Duluth, Minn., on July 27.

The Canadian National Railways Magazine with the July issue appears in a new size—10¾ in. by 14¼. The old size was 8½ by 11½. The format resembles in a general way that of the large-page magazines of general distribution.

The Interstate Commerce Commission has suspended the effective date of its first train control order as to Kansas City Southern until further order and that of second order as to Chicago & Alton, which was also granted an extension to January 1 under the first order.

Southern and Southwestern Railway Club Holds Annual Outing

The annual outing of the Southern and Southwestern Railway Club was held in Atlanta, Ga., Thursday, July 15. The forenoon was devoted to a business meeting. A. J. Law, master mechanic, N. C. & St. L., president of the club, presided. A. G. Pack, chief of the Bureau of Locomotive Inspection, was to have read a paper entitled, "The Advantages of Organization and the Maintenance of Motive Power," but was unable to be present. The meeting adjourned promptly at noon and buses transported the members to a nearby park where an old-fashioned barbecue was indulged in. The members also had the pleasure of visiting a house which is an exact replica of the old home of Robert Burns in Scotland.

A. R. A. Approves Tie Specifications

In a letter directed to the members of the American Railway Association, dated July 1, 1926, and just distributed, R. H. Aishton, president, stated that the specifications for cross-ties and for switch-ties adopted at the last annual convention of the American Railway Engineering Association have also been approved by the Board of Directors of the American Railway Association on May 19 as recommended practice. Mr. Aishton's letter follows in full:

"Specifications for cross-ties and for switch-ties, formulated by the Engineering Division, have been approved by the Board of Directors as recommended practice.

"The 1926 tie specifications supersede those heretofore in use. The changes in them from those adopted in 1921 are the result of five years' study and experience. The revised standards which are attached represent the best current practice and it is the belief of the Committee on Ties of the Engineering Division that the inspection of ties in strict accordance with these specifications will bring about distinct improvement in the tie industry.

"The accompanying specifications are acceptable to the producers of ties and divergence from them by individual railroads only vitiates the result of co-operative effort through which they were developed.

"The attention of those responsible for the purchase, storage and use of ties should be specifically called to the appended quotation from the 1926 report of the Committee on Ties in regard to adherence to specifications."

The quotation referred to by Mr. Aishton is a plea for adherence to specifications presented at the March convention of the American Railway Engineering Association in which the tie committee stated that an examination of approximately 3,000,000 cross-ties accepted by 15 railroads in 1925 clearly showed: (1) That ties meeting fully the American Railway Association specifications for ties can be and were being produced in large numbers. (2) That on certain railroads practically all ties fully meet the requirements of the A. R. A. specifications. (3) That certain railroads overgrade their ties. (4) That certain railroads accept decayed ties. (5) That certain railroads allow sound ties to decay while seasoning under improper conditions.

Where Freight Rates and Passenger Fares Go

The calendar shown herewith is a miniature reproduction of a large poster, printed in colors which has been issued by the Committee on Public Relations of the Eastern railroads for display in railroad stations and other places where it will be of interest.

The total amount of the gross operating revenues of the Class I railroads of the country, for the year 1924, has been divided by 365, thus showing the average revenue for one day; then,

Calendar Showing Distribution of the Railroad Dollar by Days

taking the different classes of expenditures, it is shown that out of the gross revenues of the year—

157 days went for wages;
27 days for locomotive fuel;
70 days for materials and supplies;
24 days for operating expenses;
21 days for taxes;
41 days for interest and rents ("fixed charges");
19 days for dividends;
6 days for improvements purchased out of earnings or to reserves.

The committee proposes to prepare a similar calendar for 1927, showing results based on the earnings for 1925.

The Committee on Public Relations of the Eastern Railroads

(*Continued on page* 164)

Freight Operating Statistics of Large Steam Roads—Selected Items for May, 1926,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1926	407	243,461	260,401	27,656	5,649	67.8	289,406	110,085	128	13	9.3	17
	1925	404	255,277	272,763	27,783	5,371	68.7	271,577	102,904	124	17	11.8	8
Boston & Maine	1926	2,250	501,490	590,527	57,906	13,849	71.5	685,375	279,124	340	82	19.5	41
	1925	2,282	509,876	585,777	58,027	13,390	71.4	661,749	270,639	345	104	23.2	39
N. Y., New H. & Hartf.	1926	1,892	500,823	532,026	35,102	14,883	69.4	757,201	311,811	280	44	13.5	18
	1925	1,920	484,102	501,995	31,448	13,517	69.5	684,999	279,270	291	66	18.4	29
Great Lakes Region:												
Delaware & Hudson	1926	875	393,786	538,002	57,056	11,523	65.3	714,492	351,060	237	43	15.3	65
	1925	875	394,961	536,101	52,841	10,631	65.1	678,282	335,994	249	34	12.2	84
Del., Lack. & Western	1926	993	614,009	726,161	95,318	19,428	67.5	1,115,546	494,099	275	54	16.3	11
	1925	993	582,204	689,582	88,586	18,578	69.7	1,034,335	463,183	298	63	17.4	38
Erie (inc. Chic. & Erie)	1926	2,323	950,462	1,044,451	109,413	36,292	65.0	2,182,161	958,624	559	123	18.0	118
	1925	2,325	889,746	989,952	101,492	34,345	66.8	2,042,874	927,949	634	102	13.8	214
Lehigh Valley	1926	1,345	637,019	702,649	82,466	20,587	65.1	1,212,000	544,146	390	89	18.6	56
	1925	1,357	607,281	666,311	72,944	19,018	64.9	1,121,374	505,884	437	75	14.7	97
Michigan Central	1926	1,835	615,535	632,014	20,788	21,669	62.1	1,170,758	409,662	274	50	15.3	85
	1925	1,826	566,273	581,433	19,809	19,924	62.8	1,059,952	379,514	308	52	14.4	109
New York Central	1926	6,482	2,093,449	2,354,936	160,385	80,857	64.4	4,753,709	2,057,308	1,195	336	21.9	361
	1925	6,478	1,979,988	2,203,585	149,806	74,984	63.3	4,457,961	1,916,024	1,217	364	23.0	374
New York, Chic. & St. L.	1926	1,665	648,624	658,231	7,498	20,937	65.2	1,141,511	439,573	242	52	17.9	55
	1925	1,669	640,307	652,752	8,488	20,340	65.8	1,098,978	428,311	243	64	20.9	57
Pere Marquette	1926	2,179	433,849	441,491	6,949	11,152	64.7	624,643	255,790	185	26	12.4	20
	1925	2,198	389,100	395,204	8,159	10,159	65.5	564,564	247,710	189	24	11.4	38
Pitts. & Lake Erie	1926	231	124,156	126,815	1,868	4,188	64.0	311,016	174,644	58	24	28.8	17
	1925	231	116,017	117,360	1,206	3,926	65.4	291,035	169,373	72	16	18.3	28
Wabash	1926	2,497	746,875	774,417	11,487	22,939	65.8	1,275,236	495,253	306	68	18.2	55
	1925	2,497	673,215	701,498	11,680	21,846	67.4	1,188,564	472,578	319	74	18.8	69
Central Eastern Region:												
Baltimore & Ohio	1926	5,197	1,973,230	2,279,990	181,814	58,113	62.0	3,764,162	1,778,318	1,019	200	16.4	151
	1925	5,196	1,827,346	2,131,976	163,651	54,247	64.8	3,381,304	1,627,925	983	269	21.5	132
Central of New Jersey	1926	691	277,619	304,124	42,311	8,232	59.8	554,225	263,875	231	35	13.2	62
	1925	692	286,152	317,665	39,418	7,554	60.3	495,190	242,776	234	41	14.8	33
Chicago & Eastern Ill.	1926	945	231,599	232,474	3,561	6,528	64.9	373,302	165,119	127	36	22.3	50
	1925	945	211,664	212,162	2,917	6,016	64.8	350,560	163,541	131	31	19.0	60
Clev., Cin., Chic. & St. L.	1926	2,374	740,878	775,754	27,454	24,009	62.5	1,531,899	713,121	338	104	23.5	36
	1925	2,376	704,788	748,135	16,308	22,477	61.5	1,437,898	661,765	349	86	19.8	78
Elgin, Joliet & Eastern	1926	460	131,269	136,740	5,990	3,970	64.2	302,739	154,953	79	12	12.7	...
	1925	460	122,001	128,806	4,599	3,664	64.5	278,209	148,139	72	19	20.9	...
Long Island	1926	393	51,618	57,660	16,049	685	53.7	45,997	18,240	48	9	15.8	...
	1925	393	47,492	51,264	13,888	631	56.5	40,866	16,598	42	11	20.3	...
Pennsylvania System	1926	10,880	4,799,988	5,182,918	375,730	143,247	64.0	9,279,798	4,299,055	2,649	588	18.2	354
	1925	10,923	4,649,281	4,983,508	371,741	132,798	63.6	8,708,714	4,066,716	2,573	794	23.6	179
Reading	1926	1,131	660,057	722,054	69,777	17,959	60.8	1,234,097	622,591	365	68	15.7	69
	1925	1,132	650,261	715,410	72,792	16,956	61.2	1,156,055	587,300	376	81	17.7	79
Pocahontas Region:												
Chesapeake & Ohio	1926	2,650	1,184,442	1,255,572	43,049	38,596	56.5	3,129,686	1,708,390	556	90	13.9	68
	1925	2,601	1,164,364	1,219,208	35,108	36,677	56.9	2,966,739	1,618,784	482	98	17.0	28
Norfolk & Western	1926	2,231	916,497	1,115,547	44,306	32,046	59.2	2,630,678	1,406,041	603	49	7.6	176
	1925	2,230	825,724	1,003,126	30,319	26,737	59.6	2,126,893	1,137,427	572	83	12.7	148
Southern Region:												
Atlantic Coast Line	1926	4,928	916,350	939,241	16,484	24,540	60.2	1,401,689	533,396	445	45	9.2	44
	1925	4,889	872,195	886,587	13,477	22,827	62.2	1,263,614	481,536	368	62	14.4	20
Central of Georgia	1926	1,907	395,056	397,749	6,951	8,565	65.3	507,843	225,609	148	27	15.7	4
	1925	1,907	358,813	360,713	5,004	7,429	67.4	417,594	183,802	144	14	9.1	25
I. C. (inc. Y. & M. V.)	1926	6,225	1,913,976	1,923,682	46,266	53,362	63.7	3,314,449	1,385,995	746	93	11.1	24
	1925	6,225	1,846,274	1,859,811	39,452	52,992	62.9	3,294,015	1,359,264	780	99	11.3	88
Louisville & Nashville	1926	5,021	1,839,796	1,925,713	62,384	36,547	58.5	2,507,968	1,179,126	608	109	15.2	21
	1925	5,027	1,768,434	1,860,826	66,338	34,431	60.5	2,303,502	1,038,346	615	105	14.6	40
Seaboard Air Line	1926	7,905	584,579	597,351	8,094	15,065	63.0	854,891	336,997	328	29	8.0	11
	1925	3,755	607,583	617,641	14,611	14,838	62.1	841,239	318,744	227	33	12.6	1
Southern Railway System	1926	8,043	2,254,570	2,297,454	44,811	53,450	62.9	3,066,240	1,231,767	1,027	159	13.4	22
	1925	8,157	2,057,218	2,093,929	42,386	49,226	63.6	2,753,134	1,083,233	1,087	137	11.2	94
Northwestern Region:												
Chic. & North Western	1926	8,457	1,493,734	1,536,937	26,433	38,378	64.0	2,246,114	875,563	734	164	18.3	100
	1925	8,469	1,323,014	1,368,166	22,456	33,143	64.0	1,842,451	732,127	751	199	20.9	148
Chic., Milw. & St. P.	1926	11,190	1,465,329	1,566,734	95,935	44,664	66.9	2,464,467	1,055,446	868	202	18.9	220
	1925	11,202	1,468,595	1,546,018	74,014	43,707	66.5	2,436,091	1,062,754	944	182	16.1	158
Chic., St. P., Minn. & Om.	1926	1,819	304,984	328,147	12,547	6,165	65.7	331,595	131,183	167	32	15.9	3
	1925	1,819	287,667	307,597	12,107	5,788	67.5	305,558	123,113	159	39	19.8	2
Great Northern	1926	8,221	730,195	758,898	43,304	27,562	66.1	1,638,266	783,008	565	154	21.4	139
	1925	8,253	733,307	759,165	41,284	27,242	66.5	1,624,678	805,628	580	167	22.3	131
M., St. P. & S. Ste. M.	1926	4,372	516,319	529,926	4,293	13,406	68.0	709,250	312,755	298	43	12.5	23
	1925	4,372	494,509	506,807	5,229	12,806	69.0	657,657	292,827	297	45	13.0	29
Northern Pacific	1926	6,510	809,596	847,865	45,694	27,301	68.7	1,517,554	667,574	499	142	22.1	97
	1925	6,435	757,374	790,226	40,526	25,318	71.5	1,378,195	630,406	521	165	24.1	95
Oreg.-Wash. R. R. & Nav.	1926	2,185	188,003	199,059	15,938	5,940	74.9	323,034	151,977	132	21	13.6	14
	1925	2,185	181,906	192,131	16,229	5,075	72.8	274,282	123,297	139	26	15.5	21
Central Western Region:												
Atch., Top. & S. Fe. (incl. P. & S. F.)	1926	10,143	1,520,081	1,628,418	82,225	47,429	65.5	2,747,809	1,029,311	794	146	15.6	228
	1925	10,045	1,438,962	1,539,840	81,990	44,887	67.4	2,518,519	966,140	824	158	16.1	247
Chicago & Alton	1926	1,022	289,499	320,248	4,278	7,199	59.8	447,932	169,934	143	19	11.8	38
	1925	1,022	267,401	303,877	6,117	7,205	62.6	429,337	165,676	138	18	11.7	39
Chic., Burl. & Quincy	1926	9,349	1,429,372	1,470,049	51,552	43,297	63.8	2,482,067	1,097,900	804	197	19.6	102
	1925	9,323	1,365,350	1,413,325	53,462	40,301	63.5	2,331,730	1,036,571	810	203	20.0	131
Chic., Rock I. & Pacific	1926	7,564	1,408,740	1,476,548	19,565	35,133	63.8	1,965,194	743,547	554	151	21.4	38
	1925	7,578	1,361,120	1,422,272	14,901	32,414	64.6	1,795,900	705,233	572	154	21.3	57
Denver & R. G. Wn.	1926	2,564	230,928	282,223	50,557	6,702	69.1	382,229	177,213	235	51	17.8	35
	1925	2,577	194,064	236,110	43,094	5,465	72.1	301,412	145,084	266	35	11.6	88
Oregon Short Line	1926	2,537	274,016	285,010	19,069	8,082	72.2	456,375	208,317	188	27	12.4	65
	1925	2,444	256,298	268,104	17,989	7,057	71.7	397,012	182,575	185	29	13.6	66
Sou. Pac.—Pac. Lines	1926	8,533	1,609,087	1,761,481	291,414	50,166	64.4	3,021,325	1,158,521	735	185	20.1	57
	1925	8,517	1,443,340	1,579,152	243,990	42,424	63.7	2,536,746	1,013,798	719	210	22.6	74
Union Pacific	1926	3,691	835,446	859,941	43,532	34,567	76.9	1,768,733	742,863	448	71	13.6	164
	1925	3,688	704,311	721,846	36,765	28,901	75.9	1,445,689	588,393	468	72	13.3	233
Southwestern Region:												
Gulf, Colo. & S. Fe	1926	1,897	279,764	290,230	6,214	8,673	62.6	496,821	212,462	112	25	18.1	17
	1925	1,897	274,506	285,167	5,417	7,753	62.1	486,164	211,714	107	22	17.0	9
Mo.-Kans.-Tex.	1926	1,787	254,960	255,031	4,458	8,907	59.8	520,134	193,864	107	24	18.5	39
	1925	1,787	228,123	230,815	1,680	8,055	60.9	467,254	182,255	115	17	12.7	47
Mo.-Kans.-Tex. of Tex.	1926	1,389	173,489	177,329	3,000	4,570	61.3	268,901	106,973	124	21	14.6	60
	1925	1,339	179,581	190,280	4,263	4,680	60.3	282,136	113,851	134	28	17.1	70
Missouri Pacific	1926	7,289	1,347,586	1,392,255	44,847	39,022	65.3	2,264,305	969,654	531	88	14.2	1
	1925	7,278	1,298,065	1,343,207	40,373	36,242	66.6	2,091,557	935,306	527	104	16.5	13
St. Louis-San Francisco	1926	4,895	811,628	832,826	14,902	19,672	61.9	1,168,968	480,482	431	63	12.8	69
	1925	4,801	882,772	907,185	14,142	19,091	62.5	1,118,979	453,294	428	66	13.3	35
Southern Pacific Lines (in Tex. and La.)[1]	1926	4,460	705,077	707,204	2,571	15,057	66.4	842,674	346,439	264	64	19.5	33
	1925	4,427	713,438	714,943	5,559	15,456	61.6	914,252	375,054	262	66	20.1	30
Texas & Pacific	1926	1,953	308,222	308,222	913	8,487	61.3	499,075	179,533	160	22	12.2	22
	1925	1,953	288,249	288,342	1,800	7,062	62.9	406,878	131,293	155	38	19.5	16

[1]Includes Franklin & Abbeville, Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with May, 1925, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotive and tender	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany....1926	2,451	5,386	7,837	5.4	15,437	1,189	452	19.5	453	34.3	8,727	167	65.8
1925	2,865	5,489	8,354	2.7	13,499	1,064	403	19.2	397	30.2	8,214	183	68.7
Boston & Maine....1926	13,358	14,438	27,796	7.3	14,952	1,367	557	20.2	323	22.4	4,001	129	49.6
1925	14,381	12,957	27,338	8.4	14,693	1,298	531	20.2	319	22.1	3,826	135	46.2
N. Y., New H. & Hartf..1926	18,725	20,269	38,994	15.0	17,870	1,512	623	20.9	258	17.7	5,317	119	56.6
1925	21,171	19,347	40,518	21.1	16,518	1,415	577	20.7	222	15.5	4,691	124	48.3
Great Lakes Region:													
Delaware & Hudson....1926	8,505	6,617	15,122	5.7	22,578	1,814	891	30.5	749	37.7	12,939	153	68.5
1925	8,677	6,700	15,377	6.9	21,518	1,717	851	31.6	705	34.3	12,384	169	67.2
Del., Lack. & Western...1926	16,835	8,598	25,433	4.3	21,914	1,817	805	25.4	627	36.5	16,058	153	80.8
1925	16,584	7,741	24,325	3.4	21,775	1,777	796	24.9	614	35.3	15,054	156	69.6
Erie (inc. Chic. & Erie)..1926	35,873	20,553	56,426	6.8	26,104	2,296	1,009	26.4	548	31.9	13,313	120	54.6
1925	39,025	18,454	57,479	7.0	25,333	2,296	1,043	27.0	521	28.8	12,872	116	47.8
Lehigh Valley 1926	21,507	10,280	31,787	6.0	25,231	1,903	854	26.4	552	32.1	13,046	142	52.9
1925	22,287	8,119	30,406	8.1	25,474	1,847	833	26.6	537	31.1	12,029	147	46.6
Michigan Central 1926	17,275	17,723	34,998	4.7	27,362	1,902	666	18.9	378	32.1	7,202	107	65.0
1925	16,770	17,140	33,910	4.5	26,915	1,872	670	19.0	361	30.2	6,705	112	53.9
New York Central....1926	72,075	74,567	146,642	3.9	28,341	2,271	983	25.4	453	27.6	10,238	110	53.0
1925	77,104	67,699	144,803	3.9	27,432	2,252	968	25.6	427	26.4	9,542	117	48.0
New York, Chic. & St. L.1926	13,077	10,311	23,388	6.3	24,314	1,760	678	21.0	606	44.3	8,517	106	73.0
1925	13,066	10,491	23,557	5.8	22,930	1,716	669	21.1	587	42.3	8,280	114	69.3
Pere Marquette 1926	9,978	9,218	19,196	4.3	17,235	1,440	590	22.9	430	29.0	3,787	107	68.7
1925	10,466	8,185	18,651	6.7	16,063	1,451	637	24.4	428	26.8	3,635	113	61.1
Pitts. & Lake Erie....1926	15,493	7,581	23,074	6.6	27,879	2,505	1,407	41.7	244	9.1	24,340	74	50.7
1925	16,486	6,079	22,565	4.4	27,869	2,509	1,460	43.1	242	8.6	23,605	71	43.2
Wabash 1926	15,015	10,018	25,033	2.8	25,991	1,707	663	21.6	638	44.9	6,398	119	67.7
1925	14,374	10,198	24,572	3.0	24,557	1,766	702	21.6	620	42.4	6,105	125	58.6
Central Eastern Region:													
Baltimore & Ohio....1926	69,308	34,458	103,766	3.6	20,894	1,908	901	30.6	553	29.1	11,037	151	65.1
1925	71,321	32,575	103,896	8.7	20,294	1,850	891	30.0	505	26.0	10,106	156	59.1
Central of New Jersey...1926	18,120	12,652	30,772	5.4	18,247	1,996	950	32.1	277	14.4	12,320	154	42.0
1925	19,096	10,545	29,641	3.7	16,484	1,731	848	32.1	264	13.6	11,314	167	41.9
Chicago & Eastern Ill....1926	14,580	4,048	18,628	16.7	22,051	1,612	713	25.3	286	17.4	5,636	133	46.6
1925	15,385	3,542	18,927	17.3	21,855	1,656	773	27.2	279	15.8	5,582	137	42.8
Clev., Cin., Chic. & St. L.1926	20,465	21,399	41,864	4.6	26,308	2,068	963	29.7	549	29.6	9,690	115	58.7
1925	20,950	17,574	38,524	5.6	26,145	2,040	939	29.4	554	30.6	8,983	117	56.6
Elgin, Joliet & Eastern...1926	9,872	7,768	17,640	5.0	16,337	2,306	1,180	39.0	283	11.3	10,867	127	50.6
1925	10,118	7,350	17,468	8.3	18,286	2,280	1,214	40.4	274	10.5	10,393	124	47.3
Long Island 1926	2,045	7,656	9,701	0.8	5,169	891	353	26.6	61	4.2	1,496	284	41.9
1925	2,094	5,232	7,326	1.2	5,016	860	349	26.3	73	4.9	1,361	291	40.3
Pennsylvania System 1926	215,258	86,257	301,515	9.3	21,619	1,931	896	30.0	460	23.9	12,747	123	55.4
1925	223,011	81,857	304,868	11.3	20,996	1,873	875	30.6	430	22.1	12,010	126	51.3
Reading 1926	25,805	14,898	40,703	3.6	21,059	1,870	943	34.7	493	23.4	17,763	156	59.0
1925	26,101	14,309	40,410	2.2	20,491	1,778	904	34.7	469	22.1	16,742	158	55.7
Pocahontas Region:													
Chesapeake & Ohio....1926	30,484	9,832	40,316	3.1	29,713	2,642	1,442	44.3	1,367	54.7	20,794	93	64.9
1925	31,302	10,732	42,034	4.4	26,834	2,548	1,390	44.1	1,242	49.4	20,078	101	69.8
Norfolk & Western....1926	30,028	9,384	39,412	1.9	37,431	2,870	1,534	43.9	1,151	44.3	20,327	133	57.4
1925	33,009	7,807	40,816	3.0	32,793	2,576	1,377	42.5	899	35.5	16,453	138	50.9
Southern Region:													
Atlantic Coast Line....1926	23,367	16,148	39,515	4.0	19,481	1,530	582	21.7	435	33.3	3,492	117	62.9
1925	21,347	13,998	35,345	4.6	18,667	1,449	552	21.1	439	33.5	3,177	113	67.6
Central of Georgia....1926	5,336	6,124	11,460	4.0	17,972	1,285	571	26.3	635	36.9	3,817	147	74.6
1925	5,452	5,125	10,577	5.5	16,336	1,164	512	24.7	560	33.6	3,109	141	74.7
I. C. (inc. Y. & M. V.)..1926	41,467	21,901	63,368	4.2	23,245	1,732	724	26.0	706	42.6	7,183	124	75.7
1925	50,939	19,541	70,480	6.4	23,313	1,784	736	25.7	622	38.6	7,043	123	69.7
Louisville & Nashville....1926	46,168	17,216	63,384	9.1	16,364	1,363	641	32.3	600	31.8	7,575	152	89.5
1925	44,646	15,686	60,332	9.4	15,648	1,303	621	31.9	587	30.4	7,048	156	86.4
Seaboard Air Line....1926	12,451	10,952	23,403	1.8	17,334	1,462	576	22.4	465	33.0	2,784	129	54.8
1925	12,029	9,988	22,017	3.5	15,979	1,385	525	21.5	467	35.0	2,738	133	78.4
Southern Railway System.1926	53,551	27,936	81,487	5.2	18,344	1,360	546	23.0	488	33.7	4,940	150	63.7
1925	55,493	26,900	82,393	7.2	17,899	1,338	527	22.0	424	30.3	4,284	152	56.3
Northwestern Region:													
Chic. & North Western...1926	49,136	25,216	74,352	7.1	18,391	1,504	586	22.8	380	26.0	3,340	129	56.2
1925	52,188	23,721	75,909	9.7	17,271	1,393	553	22.1	311	22.0	2,791	133	47.2
Chic., Milw. & St. P....1926	55,840	19,513	75,353	6.0	20,915	1,682	720	23.6	452	28.6	3,043	133	50.1
1925	54,877	18,777	73,654	9.5	20,054	1,659	724	24.3	465	28.8	3,060	141	46.4
Chic., St. P., Minn. & Om.1926	3,329	8,251	11,580	9.9	13,838	1,087	430	21.3	365	26.1	2,327	141	55.3
1925	3,423	8,786	12,209	8.6	13,606	1,062	427	21.2	325	22.6	2,184	146	52.0
Great Northern 1926	42,424	7,722	50,146	10.0	25,968	2,244	1,072	28.4	504	26.8	3,072	117	36.0
1925	46,625	8,580	55,205	9.7	24,869	2,216	1,099	29.6	471	23.9	3,149	116	34.6
M., St. P. & S. Ste. M..1926	18,799	5,873	24,672	5.7	15,737	1,374	606	23.3	409	25.8	2,308	105	50.7
1925	19,648	5,015	24,663	7.2	15,572	1,330	592	22.9	383	24.3	2,161	108	48.3
Northern Pacific 1926	35,477	7,306	42,783	7.8	24,036	1,874	825	24.5	503	30.0	3,308	133	45.0
1925	36,719	7,986	44,705	6.8	23,027	1,820	832	24.9	455	25.6	3,160	127	39.1
Oreg.-Wash. R. R. & Nav.1926	7,493	3,473	10,966	5.6	20,474	1,718	808	25.6	447	23.3	2,243	167	45.5
1925	6,032	4,080	10,112	4.5	18,560	1,508	678	24.3	393	22.2	1,820	186	40.8
Central Western Region:													
Atch., Top. & S. Fe. 1926	61,796	16,028	77,824	6.0	25,465	1,803	677	21.7	427	30.0	3,274	115	58.7
(incl. P. & S. F.)....1925	63,076	14,716	77,792	5.5	24,118	1,750	671	21.5	401	27.6	3,103	120	53.3
Chicago & Alton....1926	10,466	4,471	14,937	7.0	19,942	1,547	587	23.6	367	26.0	5,364	154	64.6
1925	10,775	3,553	14,328	4.2	19,470	1,606	620	23.0	373	25.9	5,230	147	64.1
Chic., Burl. & Quincy...1926	52,608	16,355	68,963	6.5	22,766	1,736	768	25.4	514	31.8	3,788	132	49.0
1925	55,078	15,213	70,291	8.1	22,333	1,708	759	25.7	476	29.1	3,587	136	46.7
Chic., Rock I. & Pacific..1926	35,446	18,450	53,896	10.5	18,583	1,395	528	21.2	445	32.9	3,171	139	68.4
1925	35,840	18,787	54,627	10.9	17,320	1,319	518	21.8	416	29.7	3,002	148	63.8
Denver & R. G. Wn....1926	11,774	2,711	14,485	3.1	16,970	1,655	767	26.4	395	21.6	2,229	185	37.5
1925	12,355	2,539	14,894	5.6	16,271	1,553	748	26.5	314	16.4	1,816	196	29.9
Oregon Short Line....1926	8,645	3,127	11,772	5.4	23,170	1,666	760	25.8	571	30.7	2,649	122	45.8
1925	9,357	3,823	13,180	4.5	22,097	1,549	712	25.9	447	24.1	2,409	129	43.2
Sou. Pac.—Pac. Lines...1926	32,797	30,527	63,324	5.8	23,138	1,878	708	22.7	580	39.7	4,304	124	72.0
1925	30,586	32,086	62,672	5.6	20,770	1,758	702	23.9	522	34.3	3,840	131	63.3
Union Pacific 1926	20,685	7,643	28,328	14.2	35,418	2,117	889	21.5	846	51.2	6,492	110	56.3
1925	20,996	8,273	29,269	13.0	32,817	2,053	835	20.4	648	41.9	5,147	117	45.3
Southwestern Region:													
Gulf, Colo. & S. Fe....1926	8,945	4,267	13,212	3.6	26,521	1,776	759	26.3	519	31.5	3,613	102	69.7
1925	9,370	4,141	13,511	3.8	24,808	1,771	771	27.3	503	29.7	3,600	107	72.5
Mo.-Kans.-Tex. 1926	9,111	3,643	12,754	4.9	29,612	2,040	760	21.8	490	37.7	3,499	89	63.7
1925	8,632	3,768	12,400	4.6	27,536	2,048	799	22.6	474	34.4	3,290	93	57.0
Mo.-Kans.-Tex. of Tex...1926	321	9,163	9,484	8.4	20,710	1,550	617	23.4	364	25.4	2,484	102	40.1
1925	241	11,669	11,910	8.2	20,896	1,571	634	24.3	308	21.0	2,644	111	38.9
Missouri Pacific 1926	29,468	18,580	48,048	7.3	21,892	1,680	720	24.8	651	40.1	4,292	121	74.9
1925	30,472	17,154	47,626	9.2	19,877	1,611	721	25.8	634	36.8	4,146	125	70.7
St. Louis-San Francisco..1926	20,468	10,777	31,245	5.2	19,049	1,440	592	24.4	496	32.8	3,166	142	55.4
1925	20,299	10,403	30,702	5.0	17,273	1,268	513	23.7	476	32.1	3,046	150	60.1
Southern Pacific Lines 1926	11,762	13,681	25,443	7.3	17,017	1,195	483	22.6	432	28.8	2,462	113	69.8
(in Tex. and La.)[1]....1925	11,472	15,000	26,472	7.8	18,032	1,281	526	24.3	457	30.6	2,733	112	70.9
Texas & Pacific....1926	6,717	5,601	12,318	5.5	21,207	1,619	582	21.2	470	36.3	2,965	102	54.8
1925	6,490	4,972	11,462	7.0	18,297	1,412	525	21.4	426	31.6	2,499	119	48.6

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

General News Department

(*Continued from page* 161)

has also issued a folder entitled "Where Freight Rates and Passenger Fares Go" and described as a popular statement of the income and expenditures of the Class I American railroads.

Farm Returns Show Further Improvement

Further improvement in the financial condition of farmers in 1925 over the preceding three years is shown by the annual survey of farm returns released by the Department of Agriculture.

Reports from 15,330 farmers in all parts of the country, according to the department statement, show an average net return of $1,297 for those farms. The average size of the farms was 304 acres, with an average investment of $17,149. Average gross receipts were $2,551, consisting of $933 from crop sales, $897 from sales of livestock, $585 from sales of livestock products, and $76 from miscellaneous products.

Average current cash expenses totaled $1,477, consisting of $386 for hired labor, $242 for livestock bought, $244 for feed bought, $69 for fertilizer, $47 for seed, $191 for taxes, $119 for new machinery and tools, and $179 for miscellaneous items.

Receipts less cash expenses averaged $1,074, in addition to which the farmer used home-grown food products valued at an average of $283. The value of fuel and house rent was not reported. On the other hand, no allowance has been made in the expense items for the labor of the farmer and his family which was estimated by the farmers at an average value of $793.

The cash balance of $1,074 represented all the cash the average farm made available to the owner-operator to pay his living expenses, take care of debts, and make improvements.

The farmers reported an increase of $223 in inventory values, which figure added to the cash balance of $1,074 made a farm net return of $1,297. Out of this amount $225 was paid as interest on indebtedness and $127 was spent for improvements.

The farm net return of $1,297 for 1925 compares with $1,205 for 15,103 farms in 1924; $1,020 for 16,186 farms in 1923, and $917 for 6,094 farms in 1922. Both receipts and expenses have increased each year during the four year period.

OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 188 Steam Roads, Including 13 Switching and Terminal Companies)

For the Month of May, 1926 and 1925

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	237,037.96	236,839.91	59,360.96	59,527.67	5,554.39	5,547.28	38,703.60	38,526.20	133,419.01	133,238.76
Revenues:										
Freight	$385,073,143	$359,366,787	$175,274,495	$165,103,370	$20,386,934	$17,897,220	$53,080,697	$49,327,106	$136,331,017	$127,039,091
Passenger	a 82,782,636	b 82,042,733	42,226,415	41,411,922	1,781,024	1,797,564	11,972,034	11,139,747	26,803,163	27,693,500
Mail	7,974,959	8,042,795	3,061,717	3,094,999	207,224	200,918	1,185,338	1,155,501	3,520,680	3,591,377
Express	12,487,731	12,028,317	5,884,559	5,696,285	257,985	267,060	1,775,653	2,026,679	4,569,534	4,038,293
All other transportat'n	17,598,276	16,594,030	10,260,565	9,688,725	217,664	196,960	945,921	847,509	6,174,126	5,860,836
Incidental	10,820,832	10,286,174	5,537,492	5,097,653	382,517	364,051	1,239,127	1,155,264	3,661,696	3,669,206
Joint facility—Cr.	1,042,374	809,975	417,206	351,439	12,611	18,586	145,428	144,748	467,129	295,202
Joint facility—Dr.	357,360	208,740	133,124	103,074	1,771	1,661	32,037	31,479	190,428	72,526
Ry. operat'g revenues	517,422,591	488,962,071	242,529,325	230,341,319	23,244,188	20,740,698	70,312,161	65,765,075	181,336,917	172,114,979
Expenses:										
Maintenance of way and structures	76,955,161	72,514,854	31,505,170	29,866,923	3,108,905	2,846,139	10,605,744	10,031,761	31,735,342	29,770,031
Mainten'ce of equipm't	106,845,800	103,447,684	51,266,511	49,584,147	4,868,902	5,217,749	14,206,450	13,416,106	36,503,937	35,229,682
Traffic	9,588,421	8,915,951	3,396,069	3,280,851	246,101	241,830	1,659,346	1,558,050	4,286,905	3,835,220
Transportation	176,741,789	173,436,739	83,790,442	82,504,444	5,939,690	5,689,158	24,787,912	23,140,703	62,223,745	62,102,434
Miscellaneous operat'ns	4,534,569	4,285,022	2,111,428	1,969,152	97,315	88,952	524,227	472,966	1,801,599	1,753,952
General	15,337,108	14,511,042	7,027,338	6,431,178	472,099	464,117	1,961,939	1,866,646	5,875,732	5,749,101
Transportation for investment—Cr.	1,239,578	1,111,864	164,651	149,792	37,552	73,092	203,173	243,776	834,202	645,204
Ry. operat'g expenses	388,763,270	375,999,428	178,932,307	173,486,903	14,695,460	14,474,853	53,542,445	50,242,456	141,593,058	137,795,216
Net revenue from railway operations	128,659,321	112,962,643	63,597,018	56,854,416	8,548,728	6,265,845	16,769,716	15,522,619	39,743,859	34,319,763
Railway tax accruals	31,604,432	28,546,587	13,575,415	12,645,916	1,518,031	1,275,669	4,272,540	3,595,977	12,238,446	11,029,025
Uncollectible ry. rev's.	152,476	172,802	81,588	91,022	2,698	3,482	17,307	20,900	50,883	57,398
Ry. operating income	96,902,413	84,243,254	49,940,015	4,117,478	7,027,999	4,986,694	12,479,869	11,905,742	27,454,530	23,233,340
Equipm't rents—Dr. bal.	6,868,496	6,071,736	4,291,610	3,661,962	d 630,108	d 444,622	1,098,799	852,227	2,108,195	2,002,169
Joint facility rent—Dr. balance	1,928,441	2,017,251	994,958	957,890	89,491	85,266	84,258	109,946	759,734	864,149
Net railway operating income	88,105,476	76,154,267	44,653,447	39,497,626	7,568,616	5,346,050	11,296,812	10,943,569	24,586,601	20,367,022
Ratio of expenses to revenues (per cent)	75.13	76.90	73.78	75.32	63.22	69.79	76.15	76.40	78.08	80.06

For Five Months Ended with May, 1926 and 1925

Average number of miles operated	237,055.35	236,822.64	59,369.74	59,549.69	5,544.60	5,535.14	38,700.52	38,510.70	133,440.49	133,227.11
Revenues:										
Freight	1,844,146,741	1,755,023,523	827,600,576	792,713,069	95,278,492	83,833,351	273,745,420	251,997,595	647,522,253	626,479,508
Passenger	c 412,299,322	e 406,368,703	201,219,352	198,502,916	9,104,217	9,342,493	68,213,284	62,262,377	133,762,469	136,260,917
Mail	39,680,116	40,216,779	14,994,188	15,435,907	1,063,468	1,057,206	5,953,077	5,738,102	17,669,383	17,985,564
Express	57,527,110	57,605,744	27,097,233	27,661,675	1,263,006	1,384,758	9,754,350	8,739,811	20,412,521	19,819,500
All other transportat'n	82,101,880	79,472,831	46,230,849	45,004,479	1,045,783	1,002,827	5,206,668	4,890,630	29,618,580	28,574,895
Incidental	49,525,372	47,608,326	25,115,084	23,785,658	1,938,828	1,713,174	7,068,489	6,291,974	15,402,971	15,817,520
Joint facility—Cr.	5,304,964	4,290,367	2,148,377	1,923,471	67,502	80,481	710,556	672,648	2,378,529	1,613,767
Joint facility—Dr.	1,889,282	1,060,321	663,181	506,786	10,747	9,959	167,380	171,365	1,047,974	372,211
Ry. operat'g revenues	2,488,696,223	2,389,525,952	1,143,742,478	1,104,520,389	109,750,549	98,404,331	369,484,464	340,421,772	865,718,732	846,179,460
Expenses:										
Maintenance of way and structures	333,197,124	313,687,254	138,689,129	132,849,441	14,793,769	13,708,043	51,072,708	46,709,133	128,641,518	120,420,637
Mainten'ce of equipm't	534,681,408	527,067,566	257,206,961	254,887,323	24,616,107	24,170,986	70,475,721	65,559,227	182,382,619	182,450,030
Traffic	46,026,247	42,603,060	16,636,933	15,725,955	1,220,828	1,124,365	8,444,223	7,692,677	19,724,263	18,010,063
Transportation	902,060,094	891,879,243	428,144,678	422,221,994	30,272,590	28,996,609	130,430,818	120,423,617	313,212,008	320,237,023
Miscellaneous operat'ns	22,438,164	20,961,342	10,439,917	9,787,654	480,384	457,985	3,156,272	2,765,463	8,361,591	7,950,240
General	76,715,357	72,107,283	35,367,874	31,885,005	2,345,422	2,337,834	9,853,821	9,253,234	29,148,240	28,631,210
Transportation for investment—Cr.	5,457,458	4,480,397	637,665	722,517	126,415	179,859	1,094,548	815,381	3,598,830	2,762,640
Ry. operat'g expenses	1,909,660,936	1,863,825,351	885,847,827	866,684,855	73,602,685	70,615,963	272,339,015	251,587,970	677,871,409	674,936,563
Net revenue from railway operations	579,035,287	525,700,601	257,894,651	237,835,534	36,147,864	27,788,368	97,145,449	88,833,802	187,847,323	171,242,897
Railway tax accruals	149,507,826	139,026,334	60,150,110	56,230,491	7,617,161	6,180,143	21,620,922	19,362,970	60,119,633	57,252,730
Uncollectible ry. rev's.	715,889	714,863	371,803	319,655	17,658	28,334	74,895	93,626	251,533	273,248
Ry. operating income	428,811,572	385,959,404	197,372,738	181,285,388	28,513,045	21,579,891	75,449,632	69,377,206	127,476,157	113,716,919
Equipm't rents—Dr. bal.	31,821,738	29,799,726	18,163,729	16,787,359	d 3,206,567	d 2,306,827	7,812,923	4,759,524	9,051,653	10,559,670
Joint facility rent—Dr. balance	9,458,223	8,909,834	4,065,243	3,972,145	496,147	468,456	531,292	489,433	4,365,541	3,979,800
Net railway operating income	387,531,611	347,249,844	175,143,766	160,525,884	31,223,465	23,418,262	67,105,417	64,128,249	114,058,963	99,177,449
Ratio of expenses to revenues (per cent)	76.73	78.00	77.45	78.47	67.06	71.76	73.71	73.90	78.30	79.76

a Includes $3,152,287 sleeping and parlor car surcharge. b Includes $3,016,855 sleeping and parlor car surcharge. c Includes $16,255,567 sleeping and parlor car surcharge. d Deficit or other reverse items. e Includes $14,832,098 sleeping and parlor car surcharge.

Traffic News

The New York, New Haven & Hartford will open an off-line office at San Francisco, Cal., some time during this month. The company last week opened a new office at Philadelphia.

A. R. Fay, who has for forty years been in charge of the transportation department and the refrigerator lines of Swift & Company will retire on September 1. He will continue as chairman of the executive committee of the North Kansas City Bridge & Railroad Company and other North Kansas City companies, and will remain as vice-president of the St. Paul Bridge & Terminal Railroad, and other terminal companies.

The Chicago, Milwaukee & St. Paul has reduced the running time of its Columbian by 3½ hours westbound from Chicago to Tacoma, Wash., and by 10 hours eastbound. Under the new schedule the Columbian leaves Chicago at 10:20 a. m., instead of 8:15 a. m., and arrives in Tacoma at 9:15 a. m. the third morning instead of 10:50. Returning, it leaves Tacoma at 6:45 p. m., as previously, and arrives in Chicago at 8:45 p. m., instead of 7:00 a. m. the third morning.

The daily average movement of freight cars in May was the highest for any May on record, amounting to 29.8 miles per day, according to reports compiled by the Bureau of Railway Economics. This was an increase of 1.2 miles over the average for the best previous May, which was in 1923, and an increase of 2.5 miles over that of May last year. The average load per car in May was 26.8 tons, the same as that for May last year but four-tenths of a ton above that of May, 1924. Compared with May, 1923, however, it was a decrease of 1.2 tons.

Grain Sampling Restricted

The Minnesota Railroad and Warehouse Commission on July 17 issued an order restricting grain sampling and providing that no samples be taken except under the direction of the state grain inspection department. The order becomes effective on August 1, and was invoked to eliminate promiscuous sampling. It limits the number of samples to be taken from a car to two, one by a state grain inspector and the other by an authorized sampler who must take his sample at the same time the state inspector takes his.

Wheat Movement Establishes Record

The harvesting of wheat this year has occurred earlier than at any previous time, and as a result the railroads have been called upon to handle the movement before plans were completed. The early harvest is due to the more general usage of combines which harvest and thrash the wheat at the same time, together with favorable weather and an advance in price. At the present time 1,000 cars per day are being shipped from Kansas alone and more than 200,000 bu. of grain have been forced to lie in the fields awaiting cars because of the difficulty of returning empty cars. During the period from July 1 to July 17 the Atchison, Topeka & Santa Fe System alone moved 19,190 cars as compared with 6,080 during the same period last year.

The government estimate for the Kansas wheat crop made on July 1 was 139,989,000 bu. as compared with 74,750,000 bu. last year and 113,920,000 bu. for a five-year average. The estimate for Oklahoma was 69,531,000 bu. as compared with 25,354,000 bu. last year and 39,755,000 bu. for a five-year average. The total winter wheat movement as estimated on July 1 for this year was 567,752,000 bu.

New Routing Method Designed by Freight Agent

A routing method index has been compiled by A. D. Conner, freight agent of the Pennsylvania, at Indianapolis, Ind., which simplifies the work connected with the routing of freight by eliminating the reference to official guides or maps for towns located between certain points. The Pennsylvania's A. D. 5006 alphabetical and geographical list of local stations and coal mines is used for the new index. The leading classification number is inserted after the station name in this index. The route man refers to his alphabetical list of stations and he finds following the name of that station the number which designates or represents the particular car in which the shipment concerned should be loaded.

As an example a consignment of freight is to be shipped to Strawberry Ridge, Pa. With the new classification at hand the route man finds that Strawberry Ridge is shown at station No. 3323, the town being in Pennsylvania on the Williamsport division of the Eastern Region. The number 77, which appears after the name of the station in the new index gives him at once the proper car in which to load the shipment.

Nearly Million Cars of Produce Shipped Last Year

Shipments of 38 fruits and vegetables in the United States last year filled 978,927 cars, an increase of about 10,000 cars over 1924, according to Department of Agriculture figures. White potatoes alone filled 241,528 cars, apples 118,036 cars, grapes 81,865 cars, oranges 57,035 cars, watermelons 44,184 cars, and peaches 40,829 cars.

These figures do not include shipments by small boat lines, and by wagons and trucks.

TOTAL SHIPMENTS OF PRODUCTS REPORTED DURING 1925

	Cars		Cars
Apples	118,036	Melons, miscellaneous	3,654
Asparagus	1,906	Mixed Citrus Fruit	4,860
Cabbage	39,956	Mixed Deciduous	7,112
Cantaloupes	30,168	Mixed Vegetables	32,211
Carrots	3,488	Onions	31,073
Cauliflower	5,288	Oranges	57,035
Celery	21,108	Peaches	40,829
Cherries	2,304	Pears	21,015
Cranberries	2,014	Peppers	2,372
Cucumbers	8,492	Plums and Prunes	5,195
Dried Apples	1,338	Spinach	7,955
Dried Peaches	624	Strawberries	12,246
Dried Prunes	7,927	String Beans	5,224
Dry Beans	17,540	Sweet Potatoes	18,571
Eggplant	367	Tomatoes	28,233
Grapefruit	19,933	Turnips and Rutabagas	1,709
Grapes	81,865	Watermelons	44,184
Green Peas	2,707	White Potatoes	241,528
Lemons	11,590		
Lettuce	37,270	Total	978,927

Passenger Revenues Continue to Increase

Railway passenger revenues in the first four months of 1926 exceeded those for the corresponding period of last year, according to the Interstate Commerce Commission's monthly statement of railway traffic statistics, in spite of a slight loss in the number of passengers carried. The total passenger revenues for the period amounted to $329,321,101, as compared with $324,105,923 in the first four months of 1925. The number of revenue passengers carried was 286,984,000, as compared with 295,980,000, but the passengers carried one mile aggregated 10,794,834,000, as compared with 10,654,851,000 last year, because of an increase in the average mileage per passenger per road from 36 miles in 1925 to 37.61 miles in 1926. The average revenue per passenger mile also showed a slight increase from 3.042 cents to 3.051 cents.

For April alone the passenger revenues amounted to $80,580,968, as compared with $78,347,183 in the corresponding period of last year. The number of revenue passengers was smaller than that of the corresponding period of last year, but the total passenger mileage was greater, due to the increase in the average mileage.

Mid-West Shippers' Advisory Board Meeting

Generally satisfactory business conditions will exist throughout the territory of the Mid-West Shippers' Advisory Board for the next three months, according to detailed reports presented at the tenth regular meeting on July 14, at Davenport, Iowa. Increased business in the next three months, as compared with the corresponding period in 1925, was predicted for dairy products, soap, agricultural implements, clay products, iron and steel products, confectionery, grain and corn products, fresh fruits and vegetables and grain. The continuation during the next three months of about the same level of business activity as in the third quarter of 1925 was predicted for furniture, scrap iron, canned goods, groceries and food products, and for live stock. Decrease in the next three months under the level of

the third quarter of 1925 were reported for lumber, paper and pulp products, sand, gravel and crushed stone, and for hides and leather.

Dairy products are expected to show an increase of from 8 to 10 per cent over the same period last year, while soap shipments will show an increase of approximately 10 per cent. Clay products manufacturers in the mid-west territory will require approximately 11,000 cars for loading in the next three months, which is about 14 per cent above the corresponding 1925 total.

The production for the next three months of iron and steel will exceed the third quarter of 1925 by about 10 per cent, while a probable increase of 10 per cent in the movement of canned milk will offset slightly lower traffic in other canned foods.

Winter Wheat Movement Under Way

All railroads are requested to have the distribution of box cars given continuous and close attention to avoid any possible car shortage in the period of heavy wheat movement now impending, in a circular letter issued by L. M. Betts, manager, closed car section, of the Car Service Division of the American Railway Association. The winter wheat movement is under way in heavy volume, particularly from Texas and Oklahoma where a crop second largest in the history of these states is being harvested, Mr. Betts says. Cutting and threshing of grain is proceeding rapidly northward through Kansas and into Nebraska, and will soon be general in all winter wheat states.

For several reasons the crop movement is putting unusual demands upon the local railroads according to the circular:

1st. The remarkably heavy production in certain areas, notably from central Kansas south to the Texas Panhandle.

2nd. Hot, dry weather in late May, which reduced the yields in Nebraska and northern Kansas, accomplished an unusually early maturity of grain further south, resulting in simultaneous harvesting over a large area of heavy production.

3rd. This year a much greater proportion of the crop, probably 50 percent, is being harvested with "combines"—machines which cut and thresh simultaneously, resulting in an immediate heavy movement to freight cars.

4th. Wheat loaded so soon after cutting will "sweat" in the cars, making quick movement imperative to avoid damage by heating.

5th. Unprecedented heavy loading, for this season of the year, of general traffic of all kinds on all railroads, with an especially heavy movement of coal.

The peak movement of winter wheat is likely to come in July, Mr. Betts continues, with all districts harvesting and shipping, and the problem of car supply and distribution may become acute at any time. Special conditions mentioned, and others, make the crop movement from a transportation standpoint unusually difficult. Reports already received indicate that the initial movement has been greater than ever before and has seriously depleted the supply of cars assembled for the early loading. The following factors will have to be relied upon, the circular states, to prevent any car shortage:

(a) Loading of all cars to *full carrying capacity.*

(b) *Prompt handling by railroads* and current relocation to owners under the Car Service Rules, particularly *return to owners of cars at home junction points.*

(c) *Continued heavy empty movement of Western box cars in home route from Eastern and Southeastern territory.* Substantial co-operation of railroads in such territory is shown by reduction of over 20 percent in number of Western cars on principal Eastern and Southern lines in past 60 days.

(d) *Avoiding delays at terminals.* Joint Terminal Grain Committees, composed of representatives of Grain and Milling trades and local railroads are already organized and working to expedite car movement at—

Kansas City	St. Louis
Wichita	St. Joseph
Hutchinson	Salina
Atchison	Fort Worth

(e) *Prompt movement of grain through ports.* Account large export expected through Galveston a local Terminal Grain Committee has been organized there. The United States Shipping Board has been specifically directed by the President to condition 50 boats at once for Galveston export trade and to follow with more if necessary.

The International Institute of Traffic

The International Institute of Traffic, incorporation of which was recently reported in the *Railway Age*, plans to promote interest in traffic through investigation and research and education. The constitution provides for three classes of members, designated as fellows, graduates and associates. Fellows are members who have made original contribution to the traffic and transportation profession who have demonstrated special qualifications in the field of traffic. Graduates must be persons of at least 26 years of age who have passed the prescribed examination in conformity to the regulation as to experience and educational equivalent. Eligibility in this class covers those engaged in executive or official capacity in the traffic service of an industry or establishment; in the traffic service of public or private carriers; in the public or private professional practice; in the traffic service of associated industries, chambers of commerce and civic community organizations; in governmental, either federal or state, traffic and transportation activity; and in the teaching of traffic and transportation either through correspondence or residence. The experience qualification provides for five consecutive years of official or executive experience, or seven years, not necessarily continuous, of which the last two years immediately preceding application shall have been continuous, except as to teachers, whose practical experience need not be of executive character or continuous. Associates must be 21 years of age, meeting the election and eligibility requirements of graduates; however, the experience qualification may be either three consecutive years of official or executive experience including the five-year non-continuous clause, or five years of experience without regard to capacity with the proviso for non-continuous service in seven years. Teachers in this class must present evidence of three years' experience in the traffic and transportation profession. Advancement is provided from associate to graduate membership by meeting the qualifications as to official and executive experience.

All applications for membership are passed to the Educational Board and if the board approves the application or recommends that the applicant has passed the prescribed examination, the executive council of the institute then acts upon the application for membership. Each member of the institute is authorized to describe himself or herself according to the respective class of membership, but will be more generally known as accredited traffic managers.

The fee for examination is $25.00. The examinations are not intended merely to demonstrate the applicant's knowledge founded upon text books and instruction, but is intended to demonstrate in addition his practical experience. The questions and problems presented by the educational board shall be founded upon experience as well as upon scientific theory. A syllabus and bibliography has been prepared by the institute to indicate the general scope of the examination.

The activities of the institute provide for meetings and conferences for the solution of the problems of the profession, and the discussion of papers and topics of vital interest to all in the profession. The official bulletin as well as all discussions will be supplied free to all members. A question-answer service, submitted through the various committees will be maintained, as well as a library for research and circulation among the members. The institute plans to publish educational works, and award prizes and scholarships for contributions to the science of the profession. The new International Institute of Traffic will be established by "Sigma Beta Chi," Portland, Ore., George A. Denfield, secretary. Its temporary president is Dr. Walter P. Steinhaeuser, dean of the school of commerce, Milton University, Port Deposit, Md.

THE CHICAGO, MILWAUKEE & ST. PAUL will erect a string of radio stations between Chicago and the Pacific coast to be used exclusively by the carriers for communication between points on the road. Stations will be established at Chicago, Milwaukee, Wis., Minneapolis, Minn., Miles City, Mont., Butte, Spokane, Wash., and Seattle. Stations also will be erected at Omaha, Neb., and Kansas City, Mo., to serve the southern terminals of the road. With this arrangement the company will have direct radio communication over 11,000 miles of lines. The equipment to be used will be of the short wave type. Experiments already conducted have shown that stations are able to communicate at a distance of 1,300 miles under adverse conditions.

Commission and Court News

Interstate Commerce Commission

The New England Governors' Fuel Committee and the Public Utilities Commission of Connecticut have asked the Interstate Commerce Commission to close that part of its so-called anthracite rate investigation which concerns the rates on bituminous coal from southern Virginia and West Virginia to New England, so as to separate that phase of the case from the more complicated phase which has developed covering rates from the central Pennsylvania fields to transshipment tidewater ports.

The Interstate Commerce Commission has suspended from July 21 until November 18 the operation of a proposed reduction in the rate on ex-lake iron ore, carloads, from Chicago, Ill., to Granite City, Ill., from $1.40 to $1.20.

State Commissions

Extensions of Time for New York Electrification

The Public Service Commission of New York, acting under authority of a law passed by the Legislature last winter authorizing it to grant an extension of time not exceeding five years for steam railroads operating within New York City to complete electrification of their lines in compliance with section 53-a of the Public Service Commission law, has announced its decision upon the applications of five railroads for such extension.

The New York, New Haven & Hartford was given an extension until July 1, 1928, to comply with the law. Much of the work required had been done prior to the amendment passed by the legislature last winter. Remaining work to insure compliance is equipping for electrical operation that part of the Long Island Railroad which the New Haven operates under trackage agreements between Fresh Pond Junction and Bay Ridge and equipping the freight tracks of the New York Connecting line from Port Morris across Hellgate bridge to Fresh Pond Junction.

Petition by the Staten Island Rapid Transit for a five years' extension was denied. The company's passenger facilities have been electrified. The freight service has not as yet been electrified. The larger percentage of the freight service is interstate traffic, coming from western points by way of New Jersey. Chairman Prendergast in a memorandum says electrification of such through freight service would require rebuilding of the Arthur Kill bridge at a cost said to approximate $6,000,000, and electrification of terminals and other facilities, approximately $4,000,000. Petition by the Degnon Terminal Railroad, operating a terminal line in the Borough of Queens from west of Pearson street connecting there with the Long Island, running west to near School street, a distance of about half a mile, for an extension of five years from January 1, 1926, in which to comply with the law, was denied. Petition by the Brooklyn Eastern District Terminal for a five years' extension was also denied.

The Pennsylvania, covering operation in its Sunnyside Yard in Queens and 37th street and North Fourth street yards in Manhattan, was given an extension until January 1, 1927.

Personnel of Commissions

Arthur Meighen, leader of the Conservative party in Canada, who became Prime Minister a few weeks ago by the overthrow of the Liberal government, has named W. A. Black as Minister of Railways, succeeding the Liberal minister, Mr. Dunning. Mr. Black was born in Windsor, N. S., in 1847 and at present resides in Halifax. He has been a member of Parliament since 1923 and has interested himself primarily in marine matters and in the general contention of the Maritime provinces in Parliament that they are not being fairly dealt with by the rest of Canada. One of the most insistent complaints of the Maritime provinces has been against the Canadian National Railways in operating a line to Portland, Me., and using this for export business which they feel should move through the Maritime ports of Halifax and St. John.

Foreign Railway News

117 Reported Killed in Balkan Accident

A train was buried in a landslide near Sarajevo, Bosnia, on July 17, according to reports from Vienna. Casualties reported were 117 persons killed.

Strike Threatened in Mexico

A strike is threatened in Mexico by members of the several railway unions who are opposing what is said to be an attempt by the Mexican Federation of Labor to dominate them. The government is reported to be supporting the labor federation as against the railway unions and, if the strike is called, will provide troops to protect workers who will be hired to take the strikers' places.

Railway to Mecca Proposed

The Moslem Congress at Mecca, the Times (London) reports, has recommended the connection of that city with the Red Sea port of Jeddah by a railway. The congress has also recommended the construction of a railway connecting Yembo (on the Red Sea about 200 miles to the north) with Medina, the present southern terminus of the Hejaz Railway. Each of the proposed new lines would be about 100 miles in length.

Railway Construction in Ecuador

Rail laying began during May in Ecuador (about 125 miles) on the Northern Railway from Quito to Esmeraldas, according to the Times (London). When completed, this line will give the capital of Ecuador another port, which will also be fed by the grain, fruit, and daily produce of the provinces between Quito and the Colombian frontier.

The provinces traversed include some of the most picturesque and fertile regions in the Republic. Work is shortly to begin again on the Cuenca Railway, which is to connect the Guayaquil & Quito Railway with the southern provinces. This line passes near the Biblian coal field. Contractors on both the above lines are British, but working with Ecuadorian civil engineers trained in North America.

The Puerto Bolivar Railway is advancing from the south coast of Ecuador, north of the Tumbes Desert (Peru), towards the Zaruma gold-mining center. In March and April heavy floods interrupted work. Material and rolling stock are German; the contractors are North American and Ecuadorian.

European Rail Makers Near Agreement

After a short intermediary meeting at Düsseldorf on July 8, the European railmakers have practically eliminated every remaining difficulty in the way of concluding the formation of their association and believe they will be able to sign a two-year contract with London early in August, according to a Paris dispatch to the New York Times. The dispatch continues:

To all intents and purposes therefore the European Railmakers' Association may be announced as completed and has begun functioning.

It will be recalled that the pre-war name "Irma"—International Railmakers' Association—was changed to "Erma" to avoid arousing the susceptibilities of American manufacturers.

The governing committee of the new organization is composed of four delegates representing British, French, German and Belgian manufacturers. Any orders for rails received by these countries and by Luxembourg will be submitted to the "Erma" Bureau of London, where production will be allotted according to these quotas:

Forty per cent. to Great Britain, 43 per cent to France and the Belgo-Luxembourg, and 17 per cent to Germany.

Because of the high British quota it is thought that the United States has a 20 per cent share.

The difficulty over the British colonies has been overcome through British acceptance of the plan whereby other countries

can ship rails to India and South Africa whenever the British railmakers have received their full share of orders for a period.

The price has been set at £6 per ton for heavy rails, representing an increase over recent prices.

Belgian State Railways to Be Organized Like Private Company

The effect of placing the Belgian State Railways under the management of a company, which has been decided on by the Cabinet, will be a reduction of the personnel, says a Brussels dispatch to the Times (London). The age of retirement of railway employees, which has been provisionally reduced from 65 to 60 years, will permit the immediate retirement of a considerable number. It is stated that the services of some 10,000 will be progressively dispensed with.

In all cases the new regulation will be put in operation in a spirit of generosity. A certain number of temporary employees due to be discharged, as well as others on the permanent staff, have accepted a reduction of hours, with the result that the total sum to be paid in salaries by the state will be no more than if the temporary employees had been discharged.

The board of directors of the new Société des Chemins de Fer Belges will be composed of 21 members, and the Minister of Railways will be president ex officio. Ten members will be nominated by the government, five by the board of the sinking fund, and the others by the Council of Industry and Labor, and representatives of the personnel of the railway.

Report on Indian Railway Shops

The Indian Railway Board's special technical committee, appointed to investigate and report upon the necessity for enlarging or improving the state railway shops in order to deal economically and efficiently with repairs to the increasing rolling stock, has presented its report, according to the Times (London). Sir Vincent Raven, president last year of the Institution of Mechanical Engineers of Great Britain, and technical adviser to the London & North-Eastern Railway, went out to India as chairman of the committee.

The committee states that while the existing workshops have been able to maintain rolling stock in a safe running condition, there is scope, given better organization, for considerable improvements in the direction of both economy and expedition. Criticisms are made of paucity of skilled supervision, inadequate equipment and bad layout. There is need, the report states, of improved internal organization of the shops for systematic operation on lines developed in recent years in modern shops in Great Britain and elsewhere. While the committee recommends the closing down of certain shops and the rebuilding of others, it criticizes in detail various proposals which were under consideration for extensions to, and the remodeling of, shops. It suggests reductions in some of these schemes, having in view the greater out-turn of work that will result from proper co-ordination.

The proposal to establish an entirely independent central shop for carrying out all manufacturing operations does not find favor with the committee, which recommends instead the concentration of the manufacture of locomotive spare parts at Jamalpur and Jhansi, and the construction of new passenger-train cars at Lillooah and Kanchrapara. The main shops of the North-Western Railway at Moghulpura, Lahore, are described as modern, well laid out, and excellently equipped, though these advantages are greatly offset by paucity of supervision, absence of planning, inadequate inspection of finished work, and a faulty bonus system.

Miscellaneous

The Danish State Railway accounts for 1925-1926 balance, expenditures aggregating 138,000,000 crowns and income 137,700,000 crowns. Compared with the preceding year's financial operations, a decrease in the income of about 7,000,000 crowns (from 144,500,000 to 137,700,000 crowns) is shown. Expenses during the preceding year were 139,000,000 crowns.

The Shanghai-Nanking Railway is inviting bids for 13 locomotive boilers. Specifications, conditions of contract, and complete set of drawings may be obtained on application to the Acting Chief Storekeeper of the above railway, Shanghai, at $20 per set.

Equipment and Supplies

Locomotives

THE BUFFALO CREEK & GAULEY has ordered one consolidation type locomotive from the Baldwin Locomotive Works.

THE NEW YORK CENTRAL has ordered an additional oil-electric locomotive of the 100-ton type for switching service on its west side tracks, in New York City, from the Ingersoll-Rand Company, the General Electric Company and the American Locomotive Company, which companies co-operate in its manufacture.

Freight Cars

THE SEABOARD MIDLAND PETROLEUM CORPORATION is inquiring for 200 tank cars of 8,000-gal. capacity.

THE ASIATIC PETROLEUM COMPANY is inquiring for 4 double-bogie, 5-ton oil tank cars of 2-ft. gage, for export.

THE CHICAGO GREAT WESTERN is inquiring for 300 single sheathed box cars of 40 tons' capacity and 200 single sheathed automobile box cars of 40 tons' capacity.

THE STANDARD TANK CAR COMPANY is estimating on 300 tank cars of 8,050-gal. capacity and 300 of 10,050-gal. capacity for its subsidiary the Standard Transit Company.

THE CITIES SERVICE TANK LINE COMPANY has ordered 5 tank cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of July 3.

THE GEORGIA & FLORIDA has ordered from 20 to 30 gondola cars of 50-tons' capacity from the American Car & Foundry Company. In the *Railway Age* of July 10 this company was reported as inquiring for 25 gondola cars.

Passenger Cars

THE CITY OF PHILADELPHIA is inquiring for 150 subway cars complete and 10 extra trucks.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 5 gas-electric rail motor cars to include 2 combination passenger and baggage, 2 combination mail and baggage and one baggage car.

THE NATIONAL RAILWAYS OF MEXICO have ordered 10 combination mail and express cars and 5 combination baggage and express cars from the Pullman Car & Manufacturing Corporation.

Iron and Steel

THE NEW YORK CENTRAL RAILROAD will receive bids until 12 o'clock noon, August 2, for its requirements of frogs and switches.

THE DELAWARE, LACKAWANNA & WESTERN is in the market for 15,700 tons of 130-lb. rail, 4,300 tons of 105-lb. rail and the track fittings.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 250 tons of structural steel for a bridge at Muncie, Ind., from the McClintic-Marshall Company.

THE NORTHERN PACIFIC has ordered 275 tons of structural steel for bridges at Tacoma, Wash., and 900 tons for use in Minnesota and Montana, from the American Bridge Company.

Machinery and Tools

THE CHICAGO, BURLINGTON & QUINCY has ordered one heavy circular shear from Manning, Maxwell & Moore, Inc.

THE BALTIMORE & OHIO has ordered one Chambersburg mechanical hammer from Manning, Maxwell & Moore, Inc.

THE CHICAGO & NORTH WESTERN has ordered a 53-in. vertical boring and turning mill from the Niles-Bement-Pond Company.

THE GULF, COLORADO & SANTA FE has ordered a 5,000-lb. Chambersburg hammer from Manning, Maxwell & Moore, Inc.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered a 32-in. extra heavy duty shaper from Manning, Maxwell & Moore, Inc.

THE UNION PACIFIC has ordered one 14-in. by 8-ft. tool room lathe and a Universal grinder from Manning, Maxwell & Moore, Inc.

THE MERCHANTS DISPATCH TRANSPORTATION COMPANY has ordered three 15-ton crane trolleys from the Niles-Bement-Pond Company.

THE LOUISVILLE RAILWAY COMPANY, Louisville, Ky., has ordered a 42-in. car wheel borer from the Niles-Bement-Pond Company.

THE TENNESSEE COAL, IRON & RAILROAD COMPANY has ordered a 1-in. heading and forging machine, one 10-spindle nut tapper and one 8-spindle nut tapper from Manning, Maxwell & Moore, Inc.

THE BOSTON & ALBANY has ordered a planer type surface grinder and two centering machines from Manning, Maxwell & Moore, Inc. This road has also ordered a 30-in. by 30-in. by 10-ft. slab miller from the Niles-Bement-Pond Company.

THE WABASH has ordered a 90-in. locomotive wheel quartering machine and a 6,000-lb. double frame steam hammer from the Niles-Bement-Pond Company. This road also gave an order for a single end punch and shear and a 20-in. slotting machine to Manning, Maxwell & Moore, Inc.

THE ILLINOIS CENTRAL has ordered a 200-ton Chambersburg hydraulic riveter, three 100-ton Chambersburg hydraulic straightening presses, one Chambersburg Universal flanging press, two Micro cylinder grinders, one Sundstrand link grinder, one horizontal boring, drilling and milling machine, one 14-in. by 8-ft. tool room lathe, one 16-in. by 10-ft. engine lathe, one 24-in. by 10-ft. engine lathe, one high duty vertical drill, and one 10-in. by 32-in. Universal grinder from Manning, Maxwell & Moore, Inc. This company has also ordered four floor grinders from the Niles-Bement-Pond Company.

THE CHICAGO & NORTH WESTERN is inquiring for the following machine tools: One 90-in. tire turning lathe, one 24-in. crank planer, two pipe threaders, one 6-ft. radial drill, one bench grinder, one 84-in. heavy duty face grinder, one cylinder boring bar, one double head emery wheel grinder, one sensitive drill, four bending brakes, one rotary bevel shear, one twist drill grinder, two straight line radial drills, one 6-spindle staybolt threader, two high speed hack saws, one combination hot saw and tube expanding machine, one jolt squeeze and draw molding machine, one 600-ton hydraulic wheel press, one 35-ton hydropneumatic bushing press, one 2,500-lb. steam hammer, one 90-in. crank pin turning and boring machine, and one 250-ton portable hydraulic crank pin press.

Signaling

THE BALTIMORE & OHIO has placed an order with the General Railway Signal Company for 10 model 4A switch machines for shipment to Philadelphia, Pa.

THE CHICAGO & EASTERN ILLINOIS has placed an order with the General Railway Signal Company for one intermittent inductive auto-manual type engine equipment and one inductor.

THE CHICAGO, BURLINGTON & QUINCY has ordered materials for installation in connection with a 20-lever Saxby & Farmer interlocking machine, involving S-8 electro-mechanical equipment for the East Winona, Wis., interlocking plant. The Union Switch & Signal Company is furnishing these materials and the work will be done by the Burlington construction forces.

THE FLORIDA EAST COAST has placed an order with the General Railway Signal Company, Rochester, N. Y., for the installation of automatic signals and 2,200 volt transmission line from Creighton Junction, Fla., to Maytown, to cost approximately $31,000, and from Maytown to Titusville, to cost approximately $38,300.

THE WABASH is installing an electro-mechanical interlocking on the Detroit division at South Adrian, Michigan. This plant is being erected at the crossing of the Detroit, Toledo & Ironton and involves 17 color-light and Style T2 semaphore signals, 82 d.c. relays, 28 switch boxes, electric locks, clockwork time releases, etc. The materials for the plant are being furnished by the Union Switch & Signal Company, while the field work will be done by the Wabash company's construction forces.

THE PENNSYLVANIA is installing a 35-lever electro-pneumatic interlocking at Bay View Tower, Baltimore, Md. This work is being carried out by the railroad company's construction forces with the materials for the plant being supplied by the Union Switch & Signal Company. An additional order has been placed with the Union Switch & Signal Company covering electro-mechanical interlocking equipment for installation at the Atlantic City drawbridge, "BR" Cabin. The field work will be carried out by the railroad company's construction forces.

THE NEW YORK CENTRAL has placed an order with the General Railway Signal Company for 11 Model 5A low-voltage switch machines complete with 20-volt d.c. motors for shipment to Wayneport, N. Y. This order also covers twenty-four 4-way and twenty 6-way relay boxes. The New York Central also placed an order with the General Railway Signal Company for 15 Model 4A switch machines for shipment to Buffalo, N. Y. An additional order was also placed with the General Railway Signal Company for seven Model 5A low-voltage switch machines complete with 20-volt d.c. motors for shipment to South Schenectady, N. Y.

THE CHICAGO & ALTON has placed an order with the General Railway Signal Company covering four type K color-light crossing signals for shipment to Bloomington, Ill. This order also includes two Model 9D d.c. flashing relays, two Model 9D d.c. interlocking relays and five Model 9E d.c. neutral relays. An additional order has been given to the General Railway Signal Company for 16 type K color-light highway crossing signals complete with four single light units on each pole for shipment to Bloomington, Ill. Included in this order are 16 Model 9D d.c. interlocking relays, eight Model D d.c. flashing relays and 16 4-ohm Model 9E d.c. neutral relays.

THE ERIE has placed orders with the Union Switch & Signal Company for materials for the installation of color-light automatic block signals on 29 miles of double track, between Salamanca and Cuba Junctions. In part of this section, signals will be lighted from trickle charged storage batteries, and in the remainder the signals will be illuminated from alternating current with auxiliary devices for automatically changing over from the alternating current to direct current supply from primary batteries in case of failure of alternating current supply. The materials involved cover 74 style TR color light units, 55 universal switch circuit controllers, 186 relays, lever locks, time releases, etc., as required for changes in the interlocking plants in this territory. The field work will be done by the railroad's construction forces.

THE INDIANA HARBOR BELT has placed an order with the Union Switch & Signal Company for materials necessary for the equipment of its South Gibson, Ill., classification yard with electro-pneumatically operated car retarders. This order also includes equipment for the electro-pneumatic operation of the track switches in this yard. The installation will include 29 Union electro-pneumatically operated car retarders, 31 electro-pneumatically operated switch machines and two controlling machines provided with 29 retarder controls and 31 switch controls. This installation is similar to the installation of car retarders and switch controls recently installed by the Union Switch & Signal Company in the large Northbound Markham Yard on the Illinois Central. The Indiana Harbor Belt has also had in service for some time a large installation of a similar electro-pneumatic system at its North Gibson Yard.

Supply Trade News

E. H. Batchelder, Jr., has been appointed railroad sales manager of the **Insulite Company,** with headquarters at Chicago.

Robert P. Moiser has been appointed manager of foreign sales of the **Morton Manufacturing Company,** with headquarters at Chicago.

The Electro-Motive Company, Cleveland, Ohio, has opened an office in Room 1029, Peoples Gas building, Chicago, in charge of **J. F. Sattley.**

American Fork & Hoe Company, Cleveland, Ohio, has appointed the William H. Ziegler Company, Inc., Minneapolis, Minn., its northwest representative.

C. W. Fisher, engineering sales representatives of the **McMyler Interstate Company,** Cleveland, Ohio, has been appointed district sales manager in charge of the Chicago branch.

R. P. Kelley, assistant advertising manager of the Autocar Company, Ardmore, Pa., has resigned to become advertising manager of the **Timken Roller Bearing Company,** with headquarters at Canton, Ohio.

D. W. McGeorge has been appointed sales engineer of the **Birdsboro Steel Foundry & Machine Company,** Birdsboro, Pa., manufacturer of hydraulic presses, rolling mill machinery, steel castings, etc. Mr. McGeorge was previously connected with the sales department of the Edgewater Steel Company, Pittsburgh, Pa.

Clarence G. Stoll, general manager of manufacture of the **Western Electric Company,** has been elected a vice-president, with headquarters at New York to succeed H. F. Albright, deceased. Mr. Stoll was formerly manager of the Western Electric Hawthorne works in Chicago. He began work with the company 23 years ago as a student engineer in Chicago, and a few months later he was transferred to New York, where he spent some time in the switchboard wiring, tool inspection and engineering departments. His training won for him promotion to head of the apparatus department in New York. In 1907 he returned to Chicago to take charge of apparatus design work. In October of that year practically all apparatus designing was concentrated in New York, with Mr. Stoll as head of the enlarged organization. In 1908 he took over the engineer of methods department of the New York shops and three years later was promoted to acting head of the manufacturing branch, being placed in full charge in July, 1912. The following November he went to Europe to become shop superintendent of the Western Electric Antwerp factory. When the World War broke out, the Belgian factory was closed and in June, 1915, Mr. Stoll returned to America and took over the European automatic department at Hawthorne. In March, 1916, he became superinendent of the operating branch and in October of that year he was given the superintendency of the technical branch. He became assistant general superintendent of Hawthorne in 1920 and was put in charge of all departments at Hawthorne in February, 1923, with the title of works manager.

C. G. Stoll

The Maintenance Equipment Company, Railway Exchange building, Chicago, has been appointed exclusive sales agent in the United States for the sale of the Mack reversible switch point protector. The manufacture of this device will be handled by the **Fleming Company,** successor to the J. R. Fleming & Sons Company, Scranton, Pa.

J. J. Hubbard, vice-president of the Brinard Sales & Construction Company, and also sales representative of the Signal Accessories Corporation, has resigned to become district manager of the **E. A. Lundy Company, Inc.,** with headquarters in New York. After graduating in electrical engineering from the Rochester Mechanics' Institute he entered railway service in 1902 as a draftsman in the signal department of the New York Central at Rochester, N.Y. Later he was promoted to chief draftsman in the office of the signal engineer in New York, and in 1905 he was transferred to construction work. After spending 18 months in the field he returned to the signal engineer's office as a circuit engineer, later receiving successive promotions to chief draftsman, office engineer and engineer in charge of construction. In 1911 he resigned to enter the employ of the Federal Signal Company as superintendent of construction, which position he held for one year, when he was appointed sales engineer and later eastern manager. After the consolidation of the Federal Signal Company with the General Railway Signal Company, Mr. Hubbard was appointed a sales engineer of the new organization, which position he held until 1925 when he resigned to become vice-president of the Brinard Sales & Construction Company, and also sales representative of the Signal Accessories Corporation, which positions he has held until his recent appointment.

J. J. Hubbard

Charles W. Harris, of San Francisco, Cal., has been selected to build up a sales organization for the **Dunn Painting Machine Company,** of the same city. **Robert S. Weintraub,** formerly with the Weinstock-Nichols Company, San Francisco, has been appointed special representative for the Dunn Painting Machine Company, with headquarters at San Francisco.

Charles S. Orne has been appointed manager of the **Central Steel & Supply Company,** Railway Exchange building, Chicago, Ill. This company represents the Ross-Tacony Crucible Company, William F. Jobbins, Inc., Neely Nut & Bolt Company; Rockford Malleable Iron Works and the Riverside Iron Works. **A. A. Orne** has charge of casting sales and **I. R. Robinson** specializes on crucibles and stopper heads.

The Keith Car & Manufacturing Company, Sagamore, Mass., has acquired a majority of the common stock of the **Standard Tank Car Company,** of Sharon, Pa. The directors of the company are: **W. J. McKee,** vice-president of the Keith Car & Manufacturing Company; **Ebon S. Keith,** president of the Keith Car & Manufacturing Company; **William M. Robinson** and **John G. Frazer** of the firm of Reed, Smith, Shaw & McClay, Pittsburgh, Pa.; **E. A. MacDonald,** treasurer of the Standard Tank Car Company; **H. C. Rorick** of Spitzer, Rorick & Co., Toledo, Ohio, and **H. E. Coyl,** vice-president of the Standard Transit Company. The officers

of the company are: **W. J. McKee**, president; **E. A. MacDonald**, secretary and treasurer and **J. W. Keefe**, auditor. The principal executive office will remain at Sharon, Pa. The Standard Tank Car Company owns the capital stock of the Standard Transit Company, whose directors are the same as those of the Standard Tank Car Company and the officers are the same with the addition of H. E. Coyl, vice-president.

Locomotive Shipments in June

June shipments of railroad locomotives from principal manufacturing plants, based on reports received by the Department of Commerce, totaled 159, as compared with 140 in May and 114 in June, 1925. The following table gives the shipments and unfilled orders of locomotives for each month since January, 1925:

Year and month	Shipments					Unfilled orders, end of month				
		Domestic		Foreign			Domestic		Foreign	
	Total	Steam	Electric	Steam	Electric	Total	Steam	Electric	Steam	Electric
1925										
January	98	41	12	43	2	414	322	44	33	15
February	88	69	7	9	3	414	318	51	33	12
March	117	88	13	14	2	461	324	51	71	15
April	101	78	14	9	0	490	343	41	77	29
May	101	65	9	25	2	478	324	48	75	31
June	114	58	8	42	6	411	274	47	65	25
Total (6 months)	619	399	63	142	15	...	...	..	..	..
July	76	56	12	4	4	386	259	39	65	23
August	118	91	6	13	8	334	199	48	72	15
September	100	42	16	34	8	390	278	41	64	7
October	93	47	21	24	1	530	386	40	92	12
November	106	52	8	46	0	585	435	46	64	40
December	104	68	18	14	4	708	557	54	56	41
Total (Year)	1,216	755	144	277	40	...	...	..	..	..
1926										
January	121	96	11	14	0	653	506	53	52	42
February	163	101	22	38	2	572	442	60	30	40
March	162	146	11	4	1	780	635	50	54	41
April	151	122	12	1	16	713	580	44	60	29
May	140	105	14	12	9	726	585	46	72	23
June	159	133	11	12	3	667	522	53	72	20
Total (6 months)	896	703	81	81	31	...	...	..	..	..

Obituary

Charles A. Coffin

Charles A. Coffin, founder and for 30 years head of the General Electric Company, Schenectady, N. Y., as president and chairman of the board of directors, died on July 14 at his home in Locust Valley, Long Island, N. Y. Up to within two weeks of his death Mr. Coffin had been regularly to his office in New York and continued his active interest in the progress of the electrical industry and more particularly the General Electric Company, of which he was a director.

Charles Albert Coffin was for 30 years the financial and commercial genius of the General Electric Company. Prior to the formation of that company, in 1892, he was with the Thomson-Houston Electric Company, one of the predecessors of General Electric. Mr. Coffin was born in December, 1844, in Somerset county, Maine, and graduated from Bloomfield (Me.) Academy. He went to Boston as a young man and became interested in the shoe and leather industry. Mr. Coffin, with Micajah P. Clough, formed the firm of Coffin & Clough, and established a factory at Lynn, Mass., one of the largest shoe manufacturing centers.

In 1883 Mr. Coffin became interested in the purchase of the American Electric Company of New Britain, Conn., a small concern, the head of which was Professor Elihu Thomson. The business was moved to Lynn and the name changed to the Thomson-Houston Electric Company in honor of Professor Thomson and his early associate, Professor Edwin J. Houston. Mr. Coffin became its vice-president and treasurer, and through his leadership the company developed the central station idea as applied to arc lighting. In 1888, he induced the company to enter the electric railway field, manufacturing equipment for electric street car lines in many parts of the country. A number of other electrical concerns were absorbed, and in 1892 the Thomson-Houston Company was consolidated with the Edison General Electric Company of New York under the name of General Electric Company. Mr. Coffin was immediately elected president, and directed its affairs for the succeeding 21 years.

During the electrical development of the late nineties and early years of the new century, he continued to exercise strong and inspiring leadership. He supported the work of his company's engineers in developing the Curtis steam turbine, which revolutionized the primary power sources in electric light and power stations, and he endorsed the movement to establish, in 1901, a laboratory for electrochemical research which grew to be the research laboratory of today.

Mr. Coffin retired from the presidency of the company in 1913, but became chairman of the board of directors, remaining in active participation in the company's affairs until 1922. In 1915 he was engaged in organizing the War Relief Clearing House for France and her allies. This was later consolidated with the American Red Cross in which Mr. Coffin was active throughout the World War.

He was a director in the General Electric Company, the International General Electric Company, the British Thomson-Houston Company, the Companie Francaise pour l'Exploration des Procedes Thomson-Houston, the Electric Bond & Share Company, the Electrical Securities Corporation, the American International Corporation, the Illuminating & Power Securities Corporation and the Union Carbide & Carbon Corporation. He was an officer of the Legion of Honor, of France; a commander at one time of the Order of Leopold II, of Belgium; a member of the Order of Saint Sara, of Servia, and had served as a vice-president of the Chamber of Commerce of New York and a member of the Merchants' Association of New York. Mr. Coffin was made an honorary member of the Franklin Institute, of Philadelphia, in 1924.

Trade Publications

PORTABLE AIR COMPRESSORS.—In a broadside issued by the Ingersoll-Rand Company illustrations and outline specifications offer an opportunity for an effective comparison of six sizes of portable air compressors manufactured by that company. Other illustrations outline six types of mountings for compressors and show typical tools operated by compressed air.

DIESEL ENGINES.—Fairbanks, Morse & Co., Chicago, has issued Bulletin No. 1010 entitled "Economy of Diesel Engine Power." The various factors which affect the cost of power, such as fuel cost, operating labor, maintenance, first cost and fixed charges, reliability and simplicity, are analyzed in this bulletin, and the costs of a typical small Diesel power plant are compared with similar costs for a steam plant. Other chapters cover such points as the cost of purchased power, layout of the Diesel plant, and the question of the fuel oil supply. The application of Diesel engines in a wide variety of industries is also discussed and illustrated. In addition to the photograph, the bulletin, which contains 36 pages, is illustrated with several graphic charts and diagrams.

Barcelona Express Leaving Madrid

Railway Construction

ALTON, QUINCY & NORTHERN ELECTRIC.—This company has applied to the Illinois Commerce Commission for permission to construct a railway between Alton, Ill., and Quincy, a distance of 120 miles. The line will be operated as southern branch of the Quincy & Northeast, of which Charles H. Petsch, of New York, is president.

ATLANTIC COAST LINE.—Bids on new enginehouses for Moncrief, Fla., and High Springs were closed on July 12.

BALTIMORE & OHIO.—A contract has been awarded to the Hughes Foulkrod Company, Philadelphia, for the construction of a private sales building and cold storage warehouse, comprising the second unit of the perishable products terminal which this company and the Reading are building in Philadelphia. The building will be of reinforced concrete construction, 90 ft. wide and 900 ft. long with an 8-ft. concrete platform on one side. Provision will be made for heating the unloading platforms in cold weather. The cold storage warehouse will be 8 stories high, providing 1,300,000 cu. ft. of storage space. This building will be leased for 25 years to Horace P. Serrill of Philadelphia, who will maintain and operate it.

CENTRAL OF NEW JERSEY.—A contract has been awarded to John Anderson for the construction of concrete decks, back walls, fascias, waterproofing, railings and similar work on the company's bridges 6/98 over Hudson County Boulevard and 7/08 over Avenue "A," Bayonne, N. J., to cost approximately $72,780.

CENTRAL OF GEORGIA.—A contract for the construction of a station at Fort Benning, Ga., to cost approximately $15,000 has been awarded to the Claussen-Lawrence Construction Company, Augusta, Ga.

DELAWARE & HUDSON.—The Public Service Commission of New York has granted authority to this company to construct and operate a side track adjacent to its main track extending southerly from a point south of Rouses Point a distance of about 1⅓ miles to near Coopersville.

NEW YORK CENTRAL.—A highway crossing over this company's tracks at the Second avenue and Aikin street crossing in Rensselaer, N. Y., was proposed to the Public Service Commission of the state. The plan calls for a bridge carrying the highway over the tracks of the New York Central, the Boston & Albany and East street. The structure would be 600 ft. long, of eight spans, with a 30 ft. roadway and a 5 ft. sidewalk on the south side. The estimated cost, exclusive of land and damages, is $430,000.

ST. LOUIS-SAN FRANCISCO.—A contract has been awarded to S. M. Bate & Co., Kansas City, Mo., for the construction of a one-story brick and hollow tile passenger station at Fayetteville, Ark., reported in the *Railway Age* of May 16.

SOUTHERN PACIFIC.—It is reported that surveys are being made in contemplation of the construction of a line from a point at the mouth of the Nehalem river, near Wheeler, Ore., to the mouth of the Columbia river.

SOUTHERN PACIFIC.—This company and the Central Pacific, which it operates under lease, have been authorized by the Interstate Commerce Commission to construct a 4.7-mile branch line northeasterly from Rupert, Yuba county, Calif., at an estimated construction cost of $109,315.

SOUTHERN PACIFIC.—The construction of a viaduct over Sixteenth street at Klamath Falls, Ore., has been authorized.

WENATCHEE SOUTHERN.—This company has withdrawn its recent application to the Interstate Commerce Commission for an extension of time in which to begin and complete construction of its proposed line in Washington, under the certificate issued by the commission on July 14, 1924. The commission had set the application for hearing but the company has now advised the commission that a contract for the construction has been entered into and work has been started.

Railway Financial News

BOSTON & MAINE.—*Readjustment Plan.*—See article on another page of this issue entitled Boston & Maine Readjustment Approved.

CHICAGO & ILLINOIS MIDLAND.—*Equipment Trust.*—This company has applied to the Interstate Commerce Commission for authority to issue $489,500 of equipment trust certificates, to be sold to stockholders of the company.

CHICAGO, MILWAUKEE & ST. PAUL.—*Foreclosure Sale.*—The Guaranty Trust Company and the United States Trust Company, trustees for the bondholders of this railroad are planning to file an application in Judge Wilkerson's court at Chicago on July 26 asking that the date of sale and upset price of the properties be set pursuant to the terms of the final decree of foreclosure.

CHICAGO, MILWAUKEE & ST. PAUL.—*Investigation.*—The Interstate Commerce Commission has announced that hearings in connection with its investigation of the affairs of this company will be resumed at New York on July 27 before Commissioner Cox and Examiner Bardwell and has extended an invitation to any security holders of the company who may desire to be heard to state their views at that time.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Annual Report.*—See excerpts from annual report on adjoining pages.

DELAWARE & HUDSON.—*Lease of B. R. & P.*—This company's application for authority to lease the Buffalo, Rochester & Pittsburgh for 999 years was made public by the Interstate Commerce Commission on July 19. The application states that common control, management, and operation of the two roads will result in important economies, increased operating efficiency and improved service and that it will assure an ample and continuing supply of bituminous coal for the citizens of New England and northern New York and insure to the Delaware & Hudson an undiminished flow of bituminous coal traffic as well as of other traffic.

DENVER & SALT LAKE RAILWAY.—*Hearing on Reorganization Plan.*—The Interstate Commerce Commission has assigned this company's application for authority to issue securities and take over the property of the Denver & Salt Lake Railroad for hearing at Washington on September 1 before Examiner Paca Oberlin.

GREAT NORTHERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure authentication and delivery of $45,000,000 general mortgage 4½ per cent bonds, series D, to be exchanged for a like amount of five per cent bonds, series C, now held in the treasury, and also to sell $15,000,000, series D, bonds to the First National Bank of New York and J. P. Morgan & Co. at 91½.

HUTCHINSON & NORTHERN.—*Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue $110,000 of common stock to be exchanged for a like amount of stock heretofore issued under authorization by the Public Utilities Commission of Kansas without the authority of the federal commission. The former stock is to be cancelled.

ILLINOIS CENTRAL.—*Valuation.*—Hearings on the protest against the Interstate Commerce Commission's tentative valuation will begin at Washington on September 20 before Examiner Fowler.

LEHIGH VALLEY.—*Valuation.*—Hearing on the protest against the Interstate Commerce Commission's tentative valuation has been assigned for September 8 at Washington before Examiner Faris.

MICHIGAN CENTRAL.—*Annual Report.*—See excerpts from annual report on adjoining pages.

MINNESOTA WESTERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $660,000 first

mortgage six per cent 30-year bonds, to be sold at not less than par to stockholders, directors and persons along its lines, the proceeds to be used to assist the company to construct a proposed extension of its line from Lake Lillian, Minn., to Montevideo, 43 miles, previously authorized.

MOBILE & GULF.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue $300,000 common stock, to be delivered to the W. P. Brown Sons Lumber Company, covering the purchase of the lumber company's line, which the Mobile & Gulf has been authorized by the Interstate Commerce Commission to acquire and operate.

NEW YORK, CHICAGO & ST. LOUIS.—*Pere Marquette Approves Terms.*—The directors of the Pere Marquette have approved the report of the subcommittee which has been negotiating with the Van Sweringens relative to the new terms for the inclusion of the Pere Marquette in the new Nickel Plate System. In this connection a statement was issued outlining the terms as follows:

The prior preference stock will receive in exchange 100 per cent of 6 per cent preferred stock in the new company, or at the option of the stockholder 100 per cent in Chesapeake & Ohio 5 per cent guaranteed stock. Preferred stock of Pere Marquette will receive 90 per cent of 6 per cent preferred stock in the new company or at the option of the stockholder at the end of one year $95 in cash, plus accrued dividends at the present rate of 5 per cent. The common shares will receive par in common stock in the new company.

The agreement between the Pere Marquette and Van Sweringens provides that if no final decision is made by the Interstate Commerce Commission regarding the modified plan prior to February 1, 1927, the Pere Marquette may regard itself free from any commitments and may increase the rate of dividends on its common stock or take any corporate action which its board of directors may determine.

It is also provided that holders of preferred stocks have 90 days, after the plan is declared effective, to assent and receive warrants—the prior preference holders being entitled, at their option, at any time within nine months after plan's effective date, to accept 5 per cent C. & O. stock in lieu of Nickel Plate preferred, with adjustment of dividends in each case at the date of exchange.

The Van Sweringens agree that all Pere Marquette stocks owned or controlled by them on the date the modified plan becomes effective, will be exchanged under the modified plan.

The option given the prior preference stockholders of receiving 100 per cent of their holding in 5 per cent Chesapeake & Ohio guaranteed common stock is said to be for the purpose of satisfying certain insurance companies that desire a better investment than the 6 per cent preferred of the new company.

NEW ORLEANS, TEXAS & MEXICO.—*Bonds.*—The Interstate Commerce Commission has modified previous orders covering the matter so as to extend the time within which the carrier may issue $13,500,000 first mortgage five per cent bonds, series B, to June 30, 1927. The purpose of these bonds is to retire five per cent non-cumulative income bonds, of which $9,004,100 had been exchanged up to June 4, 1926, and $4,495,000 are still outstanding.

Bonds Sold.—Kuhn, Loeb & Co. have sold at par $4,600,000 first mortgage five per cent bonds, series C, due August 1, 1956. These bonds are redeemable in whole or in part on any interest date at 105, and details of the issue are given as follows:

"These bonds are to be issued under the first mortgage of the company, dated April 1, 1924, which is a first lien, either directly or through pledge of all outstanding securities of subsidiary companies, or approximately 1,485 miles of railroad, with its appurtenances, including two ferry boats and the facilities used in the operation of the ferry over the Mississippi River at Anchorage, La., on real estate of an estimated value exceeding $3,000,000 and (subject to $2,374,000 of equipment trust obligations) on equipment having a book value, after depreciation, as of May 31, 1926, of approximately $8,823,374.

New Orleans, Texas & Mexico Railway Company is controlled, through the ownership of more than 87 per cent of its stock by Missouri Pacific Railroad Company. Missouri Pacific Railroad Company also owns a majority of the stock of The Texas and Pacific Railway Company, and the lines of these companies form, with the lines of the International-Great Northern Railroad Company, a through route from St. Louis to Houston, Galveston and the important Mexican gateways of Brownsville and Laredo.

These bonds are being sold to reimburse the treasury of the company for capital expenditures made out of income, and to provide funds necessary for the acquisition of additional properties (including a one-third interest in Texas City Terminal Railway Company) and for betterments and improvements.

Upon the completion of the present financing, there will be outstanding $15,770,000 principal amount, first mortgage 5½ per cent bonds, Series "A," $12,326,400 principal amount, first mortgage 5 per cent bonds, Series "B," $4,600,000 principal amount first mortgage 5 per cent bonds, Series "C," and $4,373,600 principal amount 5 per cent bonds, due in 1935, secured under the first mortgage ratably with the first mortgage bonds issued thereunder.

The amount of bonds secured by the first mortgage to be presently outstanding will accordingly be $37,070,000, or at the rate of only about $25,000 per mile of railroad covered by the mortgage as a first lien either directly or through the pledge of all outstanding securities of subsidiary companies.

The amount of bonds which may be issued under the first mortgage is limited to $50,000,000, and, in addition, the amount of bonds at any time outstanding, together with bonds reserved for refunding, may not exceed three times the par amount of capital stock at the time outstanding. Of the bonds remaining unissued, $4,373,600 are reserved to refund or retire the outstanding 5 per cent bonds, due in 1935, and the remainder may be issued only in respect of the acquisition of new properties or securities representative thereof, or for extensions, betterments and improvements chargeable to capital account, or (to the extent of 80 per cent of the cost thereof) for the acquisition of equipment, or for the refunding of obligations secured by a lien prior to the lien of the first mortgage on after acquired property. A sinking fund of 5 per cent per annum for twenty years is provided in respect of bonds issued for equipment expenditures.

PENNSYLVANIA.—*Withdrawn Support of Baltimore, Chesapeake & Atlantic.*—Announcement was made on July 20 that the Pennsylvania has advised the Baltimore, Chesapeake & Atlantic that it is unwilling to purchase any further coupons from its first mortgage bonds because of the continued unsatisfactory financial condition and outlook of the railway company and its inability to increase its traffic or to improve its net earnings.

In explanation of this action the following statement was made:

"The Pennsylvania has been purchasing these coupons since 1921 in the hope of affording the Baltimore, Chesapeake & Atlantic an opportunity to recuperate from the war conditions and improve its earnings, and, if possible, avoid a financial reorganization. Due to the activities of private and public motor cars and trucks, the change in markets for the products of the territory served by the Baltimore, Chesapeake & Atlantic and the greatly increased cost of railway operation, that company's condition has failed to improve, thus making it necessary for the Pennsylvania to reach this decision.

"A notice to the above effect is being sent to the holders of the $1,250,000 first mortgage bonds of the Baltimore, Chesapeake & Atlantic. The next interest coupon is due September 1st, 1926."

ST. LOUIS SOUTHWESTERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure authentication and delivery of $1,291,000 first terminal and unifying mortgage bonds.

SEABOARD AIR LINE.—*Annual Report.*—See excerpts from annual report on adjoining pages.

SEABOARD AIR LINE.—*Bonds Sold.*—Dillon, Read & Co., Ladenburg, Thalmann & Co. and Kissel, Kinnicutt & Co. have sold $8,000,000 first and consolidated mortgage six per cent bonds, series A, dated September 1, 1915, and due September 1, 1945, at 95½ per cent and interest. S. Davies Warfield, president of the Seaboard Air Line, has issued a statement, stating that the purpose of the issue is as follows:

"To meet the heavy increase in traffic the proceeds of these bonds would be used to increase facilities of the railroad, for extensions to the properties of the company and subsidiaries, for improvements, acquisitions, additions and betterments. We are installing 175 miles of automatic signals additional to the 254 miles installed last year; it is the purpose to extend automatic signals to other portions of the system. Double tracking, lengthening and providing additional passing tracks and transfer facilities at important transfer points, are among the facilities mentioned. The extension of the line from Brooksville to Inverness, some 22 miles, is also included in the facilities to be taken care of by the proceeds of these bonds, as well as to reimburse the company's treasury for expenditures for many other purposes."

WABASH.—*Bonds Sold.*—Kuhn, Loeb & Co. have sold $15,500,000 refunding and general mortgage five per cent bonds, series B, due August 1, 1976, at 95½ and interest. The entire series will be redeemable at the option of the company on August 1, 1936, or any interest date thereafter, at 105. Details concerning the issue are given as follows:

"These bonds will be issued under the refunding and general mortgage of the company dated January 1, 1925, and will be secured by a direct mortgage upon all of the lines of railroad and other property owned by the company at the date of the mortgage as therein described, including valuable terminal properties in Chicago, St. Louis and Kansas City, and on equipment (or the equity of the company therein) having a net value as of May 31, 1926, after depreciation, over outstanding equipment trust certificates, of not less than $31,269,113.

The lines of railroad covered by the mortgage comprise about 2,032 miles of first main track, 339 miles of second main track and 962 miles of other track, on various parts of which the refunding and general mortgage is subject to prior obligations issued and outstanding on January 1, 1926, in the aggregate principal amount of $62,244,435, for the retirement of which at or before maturity refunding and general mortgage bonds are reserved. None of the prior obligations may be renewed or extended and no further issues made under the indentures securing them, except that $5,936,310 principal amount of additional bonds may be issued under the Wabash first lien terminal 4 per cent trust indenture dated January 1,1904, for the acquisition of additional terminal properties. Refunding and general mortgage bonds are reserved for the retirement of any such additional terminal bonds which may be so issued. The entire bonded debt of the company, issued and outstanding as of January 1, 1926, together with the present issue, amounts to $90,244,435, equal to only $44,412 per mile of road.

The present issue of $15,500,000 principal amount of bonds is being issued to reimburse the treasury of the company for capital expenditures heretofore made and to provide additional funds for capital purposes.

The total authorized amount of refunding and general mortgage bonds which may at any time be outstanding is limited to an amount which, together with all prior obligations of the railway company as defined in the mortgage, shall not exceed one and one-half times the aggregate par value of the then outstanding capital stock of the Company.

There are now outstanding in the hands of the public $12,500,000 series "A" 5½ per cent bonds due March 1, 1975. In addition to the bonds reserved for refunding prior lien bonds, as hereinbefore stated, bonds may be issued under the refunding and general mortgage for the acquisition of new properties or to the extent limited by the mortgage, securities representative thereof, or for extensions, betterments and improvements or for 90 per cent of the cost of equipment and to reimburse the treasury of the

(*Continued on page* 179)

Annual Reports

Seaboard Air Line Railway Company, Report of the Directors for the Fiscal Year Ended December 31, 1925

BALTIMORE, MD., May, 12, 1926.

To the Stockholders and Security Owners of the Seaboard Air Line Railway Company:

The President and Board of Directors submit the following report of the affairs of the company for the year ended December 31, 1925:

Income Account for the Year Ended December 31, 1925, Compared with Year Ended December 31, 1924.

	1925	1924	Increase
Railway operating revenues..	$62,864,710.79	$53,384,173.10	$9,480,537.69
Railway operating expenses..	46,733,363.69	41,387,634.17	5,345,729.52
Net revenue from railway operations	$16,131,347.10	$11,996,538.93	$4,134,808.17
Railway tax accruals	3,023,400.64	2,442,535.36	580,865.28
Uncollectible railway revenues	22,583.50	17,807.62	4,775.88
Railway operating income...	$13,085,362.96	$9,536,195.95	$3,549,167.01
Equipment rents—Dr.	2,148,605.16	412,865.06	1,735,740.10
Joint facility rents—Dr.	114,026.92	109,816.51	4,210.41
Net railway operating income.	$10,822,730.88	$9,013,514.38	$1,809,216.50
Other income	1,100,397.44	1,035,318.48	65,078.96
Gross income	$11,923,128.32	$10,048,832.86	$1,874,295.46
Rents and other charges	987,583.21	115,342.69	872,240.52
Applicable to interest	$10,935,545.11	$9,933,490.17	$1,002,054.94
Fixed interest charges	6,850,385.20	6,601,412.68	248,972.52
Annual allottment of discount on securities	250,184.17	253,134.09	*2,949.92
Interest adjustment mortgage (income) bonds	1,250,000.00	1,250,000.00	.....
Net income	$2,584,975.74	$1,828,943.40	$756,032.34

*Decrease.

Funded Debt

During the year $4,401,500 First and Consolidated, Series "A," Six Per Cent (6%) Gold Bonds, due 1945, were delivered to the Company by the Trustee of the First and Consolidated Mortgage, in reimbursement of the Treasury for expenditures, under the provisions of the mortgage.

During the year $10,000,000 First and Consolidated Mortgage, Series "A," Six Per Cent Bonds were sold to reimburse the Company's treasury for capital expenditures against which bonds had been theretofore authenticated and delivered, and to provide funds for the payment of short term loans, necessary additions, betterments, improvements, extensions and other corporate purposes.

During the year $3,048,000 Refunding Mortgage Four Per Cent (4%) Gold Bonds, due 1959, were delivered to the Company by the Trustee of the Refunding Mortgage, under the provisions of said mortgage, and were pledged under the Company's First and Consolidated Mortgage, as therein provided.

Under Equipment Trust Agreement, Series "X," Philadelphia Plan, dated January 1, 1925, referred to in the 1924 Annual Report, there were issued and delivered during 1925, $3,390,000 principal amount of 5% Equipment Trust Certificates payable in thirty semi-annual instalments of $113,000 each on the first day of January and the first day of July in each year, commencing July 1, 1925, and ending January 1, 1940.

Equipment Trust Agreement, Series "Y," Philadelphia Plan, dated December 15, 1925, was entered into with the Central Union Trust Company of New York as Trustee, under which there was issued $2,820,000 principal amount of Four and One-Half Per Cent (4½%) Equipment Trust Certificates payable in thirty semi-annual instalments of $94,000 each, on the 15th day of June, and the 15th day of December in each year, commencing June 15, 1926, and ending December 15, 1940. The equipment to be acquired under this Trust is hereinafter enumerated.

Equipment Trust Certificates aggregating $1,909,000 matured during the year and were taken up.

The payment of $1,000,000 outstanding Raleigh & Augusta Air Line Railroad Company First Mortgage 6% Bonds, which matured January 1, 1926, was extended for five years to January 1, 1931, the bonds as extended bearing interest at the rate of 5% per annum on and after January 1, 1926.

General Remarks

Favorable business conditions in the territory served by the Seaboard continued throughout the year, with prospects of a large volume of business for 1926. Seaboard territory is forging ahead in agricultural pursuits, and in the building of new roads, schools, factories, hotels, public utilities, apartment houses and dwellings. Many new industries are being established, resulting in diversification of manufacture. The year 1925 produced the second largest cotton crop in the South's history, the greater part of the crop not exported being manufactured in the South. Cotton handled by the Seaboard in 1925 was 64,000 tons more than was handled in 1924, and this increase was exceeded by the increase in tons of cotton seed and products handled. Notwithstanding the large cotton crop, diversification in agriculture continues. The Company's Development Department has been instrumental in improving the agricultural conditions in the communities served by the railway and in presenting the truly remarkable opportunities that are offered in the Southern Country. The traffic congestion that existed generally in Florida in the fall and winter of 1925 has at the date of this report been eliminated so far as the Seaboard is concerned.

The Company handled 17,858,853 tons of revenue freight in 1925 compared with 15,427,627 in 1924, an increase of 15.8 per cent. There was an increase of 18.6 per cent in the revenue tons carried one mile. The number of revenue tons per train mile increased 8.66 per cent. Freight train revenue increased $5,591,591.35 or 14.6 per cent, 1925 over 1924. Passenger train revenue increased $3,368,769.71 or 25 per cent. Operating expenses were 74.34 per cent of the Gross Revenue in 1925 compared with 77.53 per cent in 1924. The transportation ratio was 36.47 in 1925 compared with 37.42 in the previous year and 38.89 in 1923. Taxes were $3,023,400.64 compared with $2,442,535.36 in 1924. There was expended for maintenance in 1925 $18,608,144.01 which was $1,394,265.08 more than the amount expended in 1924. The roadway and rolling stock of the Company have been maintained to the highest economical degree. The flood conditions in January and February hereinafter mentioned, and the freight congestion in Florida during the fall and winter resulted in abnormal per diem payments or equipment rentals. The elimination of the freight congestion and the purchase of additional new locomotives, freight cars and other equipment hereinafter mentioned to be delivered in 1926 will bring substantial reductions in equipment rents.

Unprecedented floods in South Carolnia and Georgia in January, 1925, the effects of which extended well into February, resulted in the breaking of the Company's main line in several places, necessitating the diversion of freight and passenger trains and the placing of embargoes for a short period. These conditions resulted in operating losses to the Company, if they had not existed the net income for the year would have been greater.

In addition to the equipment received during the year, orders have been placed in 1926 for 50 new locomotives, 2,400 new 50-ton steel gondola cars, 1,000 new 40-ton box cars, 6 all-steel combination passenger and baggage cars and 50 caboose cars.

Some of the major improvements and betterments added during the year were installation of automatic block signals between Richmond, Va., and Hamlet, N. C., a distance of 253 miles, of which 59 miles between Norlina, N. C., and Raleigh, N. C., was completed and put in operation before the close of the year, the balance being completed and put in operation the early part of 1926; increased facilities on the new Florida Cross State line to provide for the heavy traffic conditions on that line; engine terminals, shops and icing facilities at Baldwin, Fla.; yard, shop and water facilities at Wildwood, Fla.; re-laying the Waldo-Archer-Inverness line and the Tampa Northern line with heavier rail, otherwise putting those lines in condition for heavy through freight train operations, and the installation of numerous 100 car passing tracks so constructed as to become integral parts of a double track when desired.

During the year 7 miles of double track was constructed between Waldo and Baldwin south of Maxville, in connection with which reduction of grades and the straightening of the line was effected. This double track mileage was put in operation in the early part of 1926.

Opening Cross Florida Line—New Construction

In January, 1925, the new cross Florida line (204 miles) to West Palm Beach-Palm Beach from Coleman on Jacksonville-Tampa main line was opened for business. The Gross-Callahan cut-off (13 miles) near Jacksonville, Fla., was put in operation in September, 1925, shortening the mileage and resulting in substantial saving of time and expense in the movement of through freight and passenger trains in and out of Florida.

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The new Cross Florida line was opened for business January 20, 1925, when the "Orange Blossom Special," the Seaboard's crack train, was inaugurated and christened amid ceremonies attended by thousands, including five hundred guests occupying four sections of the Special. The Orange Blossom Special has become famous because of its unsurpassed equipment, unexcelled service and "always on time." This train meets a seasonal demand for high class service and will be withdrawn during the summer months. The Valrico cut-off (12 miles) near Tampa, Fla., shortening the distance across the state was put in operation in December, 1925. The cross state line connecting the East and West Coasts of Florida also gives through line service to points East and West.

In furtherance of the Company's plans for the extension of its lines and the enlargement of its facilities in Florida to meet the demands of the rapid growth of that State, the Seaboard-All Florida Railway, a subsidiary company, was formed during the year for the purpose of extending Seaboard lines from West Palm Beach to Miami and thence to Florida City (provided rights of way there are secured) on the East Coast, approximately 100 miles. On the West Coast Seaboard extension is under construction from Fort Ogden, a point on the leased Charlotte Harbor & Northern Railway to Fort Myers, approximately 36 miles, from Fort Myers to the south bank of the Estero River, approximately 14 miles, from a point of connection at or near Fort Myers on the Fort Ogden-Fort Myers line in the direction of Labelle, approximately 33 miles, and from a point on the Fort Myers-Estero line to or in the direction of Punta Rassa, approximately 11 miles, an aggregate of nearly 100 miles on the West Coast, and a total of 200 miles on both coasts. At Estero this line will connect with the Naples, Seaboard & Gulf Railway to be acquired as hereinafter stated. Adequate terminal facilities have been acquired at Miami and other points. Construction of the line from West Palm Beach to Miami and points on the East Coast and the construction of the West Coast lines referred to, is progressing rapidly.

The Seaboard's West Coast lines now under construction will traverse territory, part of which has been without railroad transportation and will serve one of the most fertile sections of Florida. These lines will afford transportation service to a large acreage of standing timber and the manufacture of lumber will become an important industry for many years. With transportation facilities the production of citrus fruits and early vegetables will increase rapidly. These lines will provide transportation for home seekers, tourist and winter home communities. The advantages offered by the West Coast of Florida are now realized.

The Brooksville and Inverness Railway, a subsidiary, was organized in the fall of 1925 for the purpose of constructing approximately 22 miles of railroad to connect the lines of the Tampa Northern Railroad, a subsidiary, at Brooksville, Fla., with the Company's Waldo-Archer-Inverness line near Inverness, Fla., and open up a substantial area of undeveloped territory. This link was put in operation under lease in December, 1925, and together with the lines of the Tampa Northern, provide a second main line of the Company between Tampa and Waldo. This additional line added greatly to the capacity of the System and assisted materially in relieving the traffic congestion then prevalent.

In November, 1925, the lines of the East and West Coast Railway, a subsidiary that was heretofore operated separately, were leased by the Seaboard and now form a part of the Company's South Florida Division.

Effective January 1, 1926, the lines of the Charlotte Harbor & Northern Railway Company, consisting of approximately 100 miles of main line, were leased under a three-year deferred purchase contract and will be operated separately under the name of "Charlotte Harbor & Northern Railway, Seaboard Air Line Railway Company, Lessee." This is an important acquisition and will form the connecting link between the present lines of the Company and the new West Coast Lines.

Under the contract with John S. Jones, the Naples, Seaboard & Gulf Railway Company was organized to construct 20 miles of new line from the southernmost terminus of the Seaboard-All Florida's West Coast lines at Estero to Naples, Fla. It will open up new territory and afford through service to the growing town of Naples on the Gulf of Mexico and Bay of Naples, a most attractive place with beautiful beaches, the latitude approximately that of Miami and one of the best situated winter resorts on the West Coast. Naples affords a far southern practical point for a deep water terminal on this Coast. The territory to be served by this line is developing and in addition to citrus fruits, early vegetables and canning industries, there are large timber areas that will later afford substantial tonnage. Naples, Seaboard & Gulf Railway will be taken over within three years by the Seaboard at cost without interest, and will be leased by this Company upon completion.

The Venice, Englewood and Southern Railway has been recently organized to extend the Seaboard line from Venice, Fla. (20 miles), to Englewood, Fla., located on Lemon Bay, and thence to a point or points of connection with the leased lines of the Charlotte Harbor & Northern. The section to be served by this line is rapidly developing. The Brotherhood of Locomotive Engineers has acquired a large area at Venice which they are extensively developing which will be served by both the Seaboard Venice line and the new line. Ready-to-use farms, including dairying and poultry raising on a large scale are to be provided. At Venice, Englewood and Woodmere extensive developments are to be made. The Venice, Englewood & Southern as a subsidiary will be operated under lease.

In March, 1926, the Company acquired the entire capital stock of the Tavares & Gulf Railroad Company, which extends from a point near Tavares, Florida, to Clermont and Ocoee, approximately 34 miles. This line will be operated separately as a subsidiary of the Seaboard. Substantial improvements will be made, including laying heavier rail.

Plans for the current year, in addition to the extensions to the System briefly mentioned, contemplate automatic signals, double tracking, establishment of division headquarters at Indiantown, Fla., with round-house, shops, etc., together with additions to passing tracks, transfer facilities, etc.

New Short Line to Western Gateways

In a letter to the stockholders dated February 16, 1926, the President of your Company briefly made mention of plans in connection with proposed extensions and acquisitions of lines by lease and/or purchase, including cut-offs and trackage which will greatly reduce mileage to and from important points and gateways in continuation of the policy to mould the Seaboard into a compact railway system. While concrete plans will be later completed and put before the Interstate Commerce Commission for approval the new construction, leased lines, cut-offs and trackage right will give the Seaboard system its third line of railroad into Tampa, St. Petersburg, intermediate and other Florida points and a new short line to and from these points, opening up new gateways via the West Coast, Perry (Fla.), Albany (Ga.), Montgomery, and Birmingham (Ala.), to the West; and a short line to Atlanta, Macon (Ga.), and intermediate points, also a short line from Atlanta via Macon to Jacksonville, Fla., and the shortest line from Atlanta via Macon to Savannah, Ga. This will open up a new and important short line route from the West via Western gateways of Birmingham and Montgomery, also from Atlanta via the proposed Inglis-Dunnellon-Wildwood cut-off, to West Palm Beach, Palm Beach, Miami, Homestead, Florida City and other important points on the East Coast and in the ridge country of Florida. Thus will be realized the Seaboard's long contemplated plan for a connection between its Atlanta-Birmingham line and its Savannah-Montgomery line and its Florida lines; the new line will also materially relieve the Jacksonville-Tampa main line to the East and West. The new construction, together with the cut-offs, leased lines and trackage rights, in conjunction with other Seaboard lines, will insure the prompt handling of Florida's growing traffic by the Seaboard System to all points.

Under arrangements, which were described in the letter of February 16, to the stockholders, an opportunity was afforded the stockholders to purchase the stock of the Investment and Securities Company of Florida and thus take part and benefit by the enhancement in value of well chosen Florida lands consequent upon the growth and development of that State in which your Company has taken so important a part. The Investment and Securities Company of Florida was organized and has acquired the lands referred to. The Railway will obtain rights of way through such land, also station and terminal sites at reasonable cost, the Investment Company's purpose will be to increase the railroad's traffic, both freight and passenger, through the development of its properties. Under the plan shareholders of your Company, both common and preferred, were entitled to subscribe to shares of the capital stock of the Investment Company at $25 per share on the basis of one-half share of Investment Company stock for each share of either preferred or common stock of the Seaboard owned and standing in the name of the shareholders of record at the close of business February 24, 1926. This right of subscription was extended to April 9, 1926. That those who may not have had the opportunity to avail of such right, stockholders by notifying the Secretary of the Company on or before July 1, 1926, may subscribe to the stock of the Investment and Securities Company on the basis mentioned, the aggregate amounts of such subscriptions may, however, necessitate limitation by the Executive Committee.

The 55,000 (approximate, acres of land referred to in the letter of February 16 to the Stockholders which is under contract to be donated to the Railway upon assurance of the construction of the new West Coast lines to the West will be acquired by the Investment and Securities Company from the Railway Company by the issue to the Railway Company of stock of the Investment Company in an amount equal to the appraised value of the said land.

The Board of Directors wishes conveyed to the officers and to those employed by the Company acknowledgement of their loyal and efficient service.

S. DAVIES WARFIELD,
President.

[ADVERTISEMENT]

The Cleveland, Cincinnati, Chicago & St. Louis Railway Company —Thirty-Seventh Annual Report

To the Stockholders of

THE CLEVELAND, CINCINNATI, CHICAGO AND ST. LOUIS RAILWAY COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1925, with statements showing the income account and the financial condition of the company.

The Year's Business

There was no congestion on the company's lines during the year and traffic was moved expeditiously. In 1925, 45,387,869 tons of revenue freight were moved, an increase over 1924 of 2,314,896 tons, or 5.37 per cent. Business from connections increased 3,820,671 tons, while that originating on the company's lines decreased 1,505,775 tons due chiefly to the unfavorable conditions affecting the union mines in the fields tributary to the company's road.

Revenue passengers carried were 4,656,340, a decrease of 894,320. The falling off was in local and commutation passengers and resulted from the growing use of the private automobile and auto bus.

There was an increase in the number of interline passengers carried due to improved train service between New York and St. Louis and to a large movement to Florida during the latter part of the year.

Income Account for the Year

	Year ended Dec. 31, 1925	Year ended Dec. 31, 1924	Increase or decrease
OPERATING INCOME	2,391.46 *miles operated*	2,398.01 *miles operated*	6.55 *miles*
Railway Operations			
Railway operating revenues	$92,061,069.50	$87,712,381.47	$4,348,688.03
Railway operating expenses	67,001,481.50	66,740,727.85	260,753.65
Net revenue from railway operations	$25,059,588.00	$20,971,653.62	$4,087,934.38
Percentage of expenses to revenues	(72.78)	(76.09)	—(3.31)
Railway tax accruals	$5,534,374.26	$4,906,836.68	$627,537.58
Uncollectible railway revenues	36,732.72	14,850.92	21,881.80
Railway operating income	$19,488,481.02	$16,049,966.02	$3,438,515.00
Equipment rents, net debit	$91,940.41	$1,112,206.36	—$1,020,265.95
Joint facility rents, net debit	835,831.67	573,492.37	262,339.30
Net railway operating income	$18,560,708.94	$14,364,267.29	$4,196,441.65
MISCELLANEOUS OPERATIONS			
Revenues	$17,068.52	$26,247.51	—$9,178.99
Expenses and taxes	17,248.96	22,181.82	—4,932.86
Miscellaneous operating deficit	$180.44	*$4,065.69	—$4,246.13
Total operating income	$18,560,528.50	$14,368,332.98	$4,192,195.52
NON-OPERATING INCOME			
Miscellaneous rent income	$283,376.72	$275,431.73	$7,944.99
Miscellaneous non-operating physical property	160,212.41	185,138.94	—24,926.53
Dividend income	371,275.90	195,413.40	175,862.50
Income from funded securities	514,579.10	443,649.80	70,929.30
Income from unfunded securities and accounts	241,649.02	319,647.92	—77,998.90
Release of premiums on funded debt	694.10	759.57	—65.47
Miscellaneous income	24,553.31	57,352.27	—32,798.96
Total non-operating income	$1,596,340.56	$1,477,393.63	$118,946.93
Gross income	$20,156,869.06	$15,845,726.61	$4,311,142.45
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads	$587,730.84	$150,299.08	$437,431.76
Miscellaneous rents	216,722.03	224,804.09	—8,082.06
Miscellaneous tax accruals	19,800.00	22,200.00	—2,400.00
Separately operated properties—loss	145,584.26	21,055.02	124,529.24
Interest on funded debt	7,450,884.60	7,073,343.08	377,541.52
Interest on unfunded debt	41,107.87	16,369.68	24,738.19
Amortization of discount on funded debt	269,730.19	234,391.52	35,338.67
Maintenance of investment organization	331.45	778.47	—447.02
Miscellaneous income charges	17,452.48	21,553.92	—4,101.44
Total deductions from gross income	$8,749,343.72	$7,764,794.86	$984,548.86
Net income	$11,407,525.34	$8,080,931.75	$3,326,593.59
DISPOSITION OF NET INCOME			
Dividends declared			
On preferred stock, 5 per cent each year	$499,925.00	$499,925.00	.....
On common stock, 5½ per cent in 1925; 5 per cent in 1924	2,586,578.50	2,351,435.00	$235,143.50
Sinking funds	45,301.33	43,218.22	2,083.11
Total appropriations of income	$3,131,804.83	$2,894,578.22	$237,226.61
Surplus for the year carried to profit and loss	$8,275,720.51	$5,186,353.53	$3,089,366.98

*Income in 1924.

Profit and Loss Account

Balance to credit of profit and loss, December 31, 1924		$36,559,879.95
Additions:		
Surplus for the year 1925	$8,275,720.51	
Donations in aid of sidetrack construction	10,369.33	
Profit on sale of equipment	2,048.08	
Reacquirement of securities below par	12,880.85	
		8,301,018.77
		$44,860,898.72
Deductions:		
Accumulated unrefundable overcharges	$14,252.08	
Surplus appropriated for investment in physical property	15,034.09	
Depreciation prior to July 1, 1927, on equipment retired during year	192,513.62	
Road property retired and not replaced	438,030.03	
Adjustment of sundry accounts (net)	75,769.28	
		735,599.10
Balance to credit of profit and loss, December 31, 1925		$44,125,299.62

Operating Revenues

The total operating revenues were $92,061,069.50, an increase of $4,348,688.03.

Freight revenue was $68,196,253.82, an increase of $4,094,862.59.

Passenger revenue was $16,322,908.19, a decrease of $231,663.52.

Mail revenue was $1,786,378, a decrease of $25,256.75 due to the loss of storage-car service from Pier 77, New York, to St. Louis which ceased to operate via this company's line on April 1, 1925, partly offset by increases in authorized service.

Express revenues was $2,162,361.66, an increase of $323,699.64, the result of a larger business handled.

Switching revenue was $1,065,292.07, an increase of $95,748.52 due to the greater volume of traffic.

Dining and buffet revenue was $783,043.45, an increase of $76,835.36 accounted for by the operation of a larger number of cars in 1925.

Other transportation, incidental and joint facility revenues were $1,744,832.31, an increase of $14,462.19.

Operating Expenses

Operating expenses, by groups, were as follows:

Group	Amount	Increase
Maintenance of way and structures	$11,020,606.51	$222,343.52
Maintenance of equipment	18,177,938.32	*1,006,394.47
Traffic	1,576,668.99	161,718.81
Transportation	32,623,355.02	117,126.54
Miscellaneous operations	805,601.59	108,118.27
General	2,832,314.89	498,741.13
Transportation for investment—credit	35,003.82	159,099.85
Total	$67,001,481.50	$260,753.65

*Decrease.

Expense for maintenance of way increased $222,343.52. Largely responsible for this increase was the laying of 7,600 more tons of new rail and the application of 40,000 more tons of stone and 45,000 more tons of gravel ballast than in 1924.

Expense for maintenance of equipment decreased $1,006,394.47. Fewer locomotives were shopped and freight cars required less extensive repairs than in 1924.

Transportation expenses increased $117,126.54. Increased expenses following the heavier tonnage were largely offset by reduced charges for fuel, for loss and damage to freight, and for other items.

General expenses increased $498,741.13. This increase is largely accounted for by the charging to the year's expenses of the total amount estimated to be required for the payment of allowances to employees retired under the pension plan in 1925 during the continuance of such allowances.

Property Investment Accounts

Changes in the property investment accounts for the year, as shown in detail elsewhere in this report, were as follows:

Road, increase	$2,508,124.90
Equipment, increase	6,891,650.49
Miscellaneous physical property, increase	591,004.71
Improvements on leased railway property, decrease	522,267.21
Net increase	$9,468,512.89

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The decrease in the account for improvement of leased railway property was the result of adjustments on account of the award by the Miami Conservancy District, amounting to $1,121,791, for the cost of relocating the line of the Cincinnati, Sandusky and Cleveland Railroad Company between Dayton and Enon, Ohio, after the 1913 flood.

Since its reorganization in 1903 the Central Indiana Railway Company has failed to earn sufficient revenue to pay operating expenses and taxes, and since the discharge of the Receiver on March 31, 1924, the company's lines have been operated at a loss both as to passenger and freight traffic. The territory in which the company's lines are situated is served by numerous other lines of railroad and if operation of the company's lines should be discontinued the communities would be adequately served by other existing railroad facilities. There is no likelihood of the property earning sufficient revenue to justify a continuation of its operation. For these reasons the Board of Directors of the Central Indiana Railway Company at a meeting held on November 24, 1925, authorized the filing of applications to the Interstate Commerce Commission and any other regulatory authorities having jurisdiction for authority to abandon operation.

Acquisition of European Loan Bonds

With additional purchases in 1925 the company's holdings of European Loan Bonds at the end of the year amounted to 39,420,000 francs, equivalent at the normal rate of exchange to $7,608,202.17. The total cost of these bonds was $3,715,592.82.

Operation of Kankakee and Seneca Railroad

The capital stock of Kankakee and Seneca Railroad Company is owned by this company and the Chicago, Rock Island and Pacific Railway Company, one-half each. The road has heretofore been operated by this company as agent for its owner, operating deficits having been contributed by its proprietor companies, under agreement between them—prior to federal control in proportion to earnings accruing to them, respectively, from traffic received from the Kankakee and Seneca and since federal control on an equal basis. An agreement dated September 1, 1925, has been made between the three companies under which this company is to operate the Kankakee and Seneca Railroad, as agent, for a period of five years from December 31, 1925, after which the proprietor companies shall have the right to alternate in operating the line for periods of five years each, operating deficits to be contributed equally by the proprietor companies. The agreement also contains provisions for reciprocal arrangements as to use of terminal facilities at Kankakee and Seneca, for furnishing by the proprietor companies of equipment, etc. The new arrangement is supplemental to the agreement dated July 26, 1881, under which the Kankakee and Seneca line was constructed, and is to continue in effect for a period of ten years from its date and thereafter until terminated by either party on six months' notice.

The Cleveland Union Terminals Company

The Cleveland Union Terminals Company issued and sold during the year an additional $5,000,000 of its fifty-year 5 per cent first mortgage bonds of series B, which were jointly guaranteed by this company and the other proprietors of the Terminals Company under the guaranty agreement dated July 17, 1923.

Advance to Evansville, Indianapolis & Terre Haute Railway Company of $1,500,000 for Redemption of Bonds and Change in Form of Investment in That Company

The company advanced to the Evansville, Indianapolis & Terre Haute Railway Company, the entire capital stock of which is owned by this company, $1,500,000, at 6 per cent per annum, to enable that company to retire its first mortgage 7 per cent bonds due May 1, 1950, amounting to $1,500,000, which were called for redemption on November 1, 1925.

In order to enable the Evansville, Indianapolis & Terre Haute Railway Company to comply with requirements of the Interstate Commerce Commission's Bureau of Accounts, this company in December, 1925, transferred $3,290,000, representing indebtedness of Evansville, Indianapolis & Terre Haute Railway Company to it for advances made by this company to that company for the purpose of enabling it to reconstruct and improve its properties and to retire its mortgage bonds, as above stated, from the account "Investments in affiliated companies—advances" to "Investments in affiliated companies—stocks."

The Board wishes to express its appreciation of the loyal and efficient service of the officers and employees of the company during the year.

For the Board of Directors,
P. E. CROWLEY,
President.

Michigan Central Railroad Company—Eightieth Annual Report

To the Stockholders of
THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1925, with statements showing the income account for the year and the financial condition of the company.

The Year's Business

During 1925 the company moved 31,053,633 tons of revenue freight, an increase over 1924 of 1,780,461 tons, attributable largely to the greater activity in the automobile industries and in highway construction work.

Revenue passengers carried were 4,490,820, a decrease compared with 1924 of 253,271. Notwithstanding the decrease in the number of passengers there was an increase in passenger revenue, the average distance each passenger was transported having increased from 124.21 miles in 1924 to 133.71 miles in 1925.

Income Account for the Year

	Year ended Dec. 31, 1925	Year ended Dec. 31, 1924	Increase or decrease
OPERATING INCOME	1,871.32 *miles operated*	1,862.25 *miles operated*	9.07 *miles*
Railway Operations			
Railway operating revenues	$91,864,377.45	$87,614,662.39	$4,249,715.06
Railway operating expenses	61,893,039.01	62,159,524.30	—266,485.29
Net revenue from railway operations	$29,971,338.44	$25,455,138.09	$4,516,200.35
Percentage of expenses to revenues	(67.37)	(70.95)	—(3.58)
Railway tax accruals	$5,864,589.76	$5,584,590.38	$279,999.38
Uncollectible railway revenues	26,187.23	30,515.20	—4,327.97
Railway operating income	$24,080,561.45	$19,840,032.51	$4,240,528.94
Equipment rents, net credit	$227,069.76	*$312,265.52	$539,335.28
Joint facility rents, net debit	543,650.02	542,483.65	1,166.37
Net railway operating income	$23,763,981.19	$18,985,283.34	$4,778,697.85
MISCELLANEOUS OPERATIONS			
Revenues	$385,183.94	$420,948.72	—$35,764.78
Expenses and taxes	341,518.59	387,868.26	—46,349.67
Miscellaneous operating income	$43,665.35	$33,080.46	$10,584.89
Total operating income	$23,807,646.54	$19,018,363.80	$4,789,282.74
NON-OPERATING INCOME			
Income from lease of road	$10.00	$10.00	.....
Miscellaneous rent income	191,038.35	171,403.50	$19,634.85
Miscellaneous non-operating physical property	81,544.38	84,984.92	—3,440.54
Dividend income	553,861.31	489,881.21	63,980.10
Income from funded securities	118,830.33	77,713.80	41,116.53
Income from unfunded securities and accounts	500,941.42	276,303.24	224,638.18
Miscellaneous income	39,115.01	3,664.29	35,450.72
Total non-operating income	$1,485,340.80	$1,103,960.96	$381,379.84
Gross income	$25,292,987.34	$20,122,324.76	$5,170,662.58
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads	$2,735,142.31	$2,734,781.88	$360.43
Miscellaneous rents	2,997.78	4,507.84	—1,510.06
Miscellaneous tax accruals	17,455.79	21,496.50	—4,040.71
Interest on funded debt	3,532,743.04	3,541,245.42	—8,502.38
Interest on unfunded debt	19,911.15	5,869.75	14,041.40
Amortization of discount on funded debt	169,245.59	177,927.00	—8,681.41
Maintenance of investment organization	1,796.44	1,775.30	21.14
Miscellaneous income charges	7,500.85	7,187.35	313.50
Total deductions from gross income	$6,486,792.95	$6,494,791.04	—$7,998.09
Net income	$18,806,194.39	$13,627,533.72	$5,178,660.67
DISPOSITION OF NET INCOME			
Dividends declared: 27½ per cent in 1925; 20 per cent in 1924	$5,152,510.00	$3,747,280.00	$1,405,230.00
Surplus for the year carried to profit and loss	$13,653,684.39	$9,880,253.72	$3,773,430.67

*Debit balance in 1924.

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Profit and Loss Account

Balance to credit of profit and loss, December 31, 1924		$56,996,823.42
Additions:		
Surplus for the year 1925	$13,653,684.39	
Unrefundable overcharges	15,126.66	
Profit on property sold	32,885.01	
Various miscellaneous items (net)	26,897.10	
		13,728,593.16
		$70,725,416.58
Deductions:		
Depreciation prior to July 1, 1907, on equipment retired during 1925	$131,471.10	
Road property abandoned and not replaced.	143,668.22	
Uncollectible accounts	4,103.21	
		279,242.53
Balance to credit of profit and loss, December 31, 1925		$70,446,174.05

Operating Revenues

The total operating revenues were $91,864,377.45, an increase of $4,249,715.06.

Freight revenue was $61,859,111.23, an increase of $3,395,144.39. Fluctuations in tons carried, by commodity groups, were:

Products of agriculture	214,623 decrease	= 7.62%
Animals and products	129,024 decrease	= 12.41%
Products of mines	857,947 increase	= 6.51%
Products of forests	38,179 decrease	= 1.60%
Manufactures and miscellaneous	1,249,309 increase	= 13.93%
Less carload merchandise	55,031 increase	= 6.25%
Net total	1,780,461 increase	= 6.08%

Passenger revenue was $20,840,641.89, an increase of $242,046.69. There were 25,756 more interline passengers carried than in 1924 but there was a decrease of 240,885 in local and of 38,142 in commutation passengers.

Mail revenue was $958,647.87, a decrease of $19,789.65.

Express revenue was $4,327,200.74, an increase of $370,200.36, largely due to increased traffic.

Switching revenue was $1,536,514.66, an increase of $255,131.60, resulting partly from increased rates effective July 1, 1924, and partly from the heavier traffic handled.

Other transportation and incidental and joint facility revenues were $2,342,261.06, an increase of $6,981.67.

Operating Expenses

The following table shows the operating expenses by groups:

Group	Amount	Comparison with 1924
Maintenance of way and structures	$10,415,588.00	$762,091.27 Decrease
Maintenance of equipment	17,618,140.86	1,160,178.57 Increase
Traffic	1,306,341.22	56,314.96 Increase
Transportation	29,219,146.62	1,275,274.45 Decrease
Miscellaneous	1,024,833.69	28,374.50 Increase
General	2,399,300.98	521,470.53 Increase
Transportation for investment—Credit	90,312.36	4,541.87 Increase
Total	$61,893,039.01	$266,485.29 Decrease

Expense for maintenance of way and structures decreased $762,091.27. There was a substantial reduction in the tonnage of rail laid and in tie renewals, the decreased expenditure for these purposes being partially offset by an increase of thirty miles in stone ballasting.

Expense for maintenance of equipment increased $1,160,178.57. In 1925 a larger number of locomotives received heavy repairs than in 1924. Although the total number of freight cars repaired was less than in 1924, there was a considerable increase in the number which received heavy repairs. The increase in depreciation charges is due to new equipment put into service.

Transportation expenses decreased $1,275,274.45, as a result of a reduction in the cost of fuel, the use of heavier and more powerful locomotives, operating economies effected in train, station and similar expenses, and other causes.

General expenses increased $521,470.53. This increase was almost entirely due to the charging to the year's expenses of the total amount estimated to be required for the payment of allowances to employees retired under the pension plan in 1925 during the continuance of such allowances.

Changes in Funded Debt

The changes in the funded debt of the company, in detail, were as follows:

The funded debt outstanding on December 31, 1924, was		$77,873,212.69
It has been increased as follows:		
N. Y. C. Lines Equipment Trust 4½ per cent certificates of May 15, 1925		1,830,000.00
		$79,703,212.69
Payments falling due during the year and on January 1, 1926, on the company's liability for principal installments under equipment trust agreements as follows:		
N. Y. C. Lines Trust of 1912, January 1, 1926.	$151,710.90	
N. Y. C. Lines Trust of 1913, January 1, 1926.	262,359.54	
M. C. R. R. Trust of 1915, October 1, 1925..	300,000.00	
M. C. R. R. Trust of 1917, March 1, 1925....	600,000.00	
Trust No. 48 (1920), January 15, 1925.....	346,400.00	
M. C. R. R. Co. proportion of N. Y. C. R. R. Co. Trust of 1920, April 15, 1925.....	467,664.75	
N. Y. C. Lines Trust of 1922, June 1, 1925..	373,000.00	
N. Y. C. Lines 4½ per cent Trust of 1922, September 1, 1925.....	51,000.00	
N. Y. C. Lines Trust of 1923, June 1, 1925..	632,000.00	
N. Y. C. Lines Trust of 1924, June 1, 1925..	233,000.00	
N. Y. C. Lines 4½ per cent Trust of 1924, September 15, 1925.....	173,000.00	3,590,135.19
leaving the funded debt on December 31, 1925 a net decrease of $1,760,135.19.		$76,113,077.50

New York Central Lines Equipment Trust of 1925

This trust was established by agreement dated May 15, 1925, to which The New York Central Railroad Company, The Michigan Central Railroad Company and The Cleveland, Cincinnati, Chicago and St. Louis Railway Company are parties. Under the trust a total of $22,500,000 of 4½ per cent equipment trust certificates are issuable of which there were issued during the year $10,530,000, maturing in equal annual installments of $702,000 in the years 1926-1940, inclusive, and representing approximately 75 per cent of the cost of equipment leased by the Trustee to the railroad companies. The equipment allotted to this company under the trust, costing approximately $2,500,000, consists of 1,000 box cars, 5 baggage cars and 2 dining cars. The certificates issued are prorated among the railroad companies in proportion to the cost of the equipment allotted to each, this company's share being $1,830,000.

Property Investment Accounts

Increase in the property investment accounts for the year, as shown in detail elsewhere in this report, were as follows:

Road	$2,722,353.45
Equipment	3,246,035.30
Improvements on leased railway property	82,288.66
Miscellaneous physical property, a decrease of	1,768.91
Total	$6,048,908.50

Improvements at Detroit

During the year the sea wall along the harbor line from Third Street to Twelfth Street, Detroit, was extended, adding substantially to the area for team tracks and freight terminal facilities. In this connection the Third street freight terminal was improved by the construction of a new outbound freight house with the necessary tracks, team track facilities, driveways, etc. An additional inbound house and a series of covered platforms between the inbound and outbound houses are under construction.

The grades of eight streets on the Bay City Division in Detroit were separated thus completing the separation for all streets west of Woodward avenue on this division. In most instances the work is of semi-permanent character under agreement with the City of Detroit and will be replaced by premanent construction at such time as necessity demands.

Removal of Old Bridge Over the Niagara River

Following the opening during the year of the new steel arch bridge over the Niagara River between Niagara Falls, Ontario, and Suspension Bridge, New York, described in the annual report for 1924, the old cantilever bridge, which had been in use for 41 years, was removed.

Stock Dividend from The Toronto, Hamilton and Buffalo Railway Company

The company received during the year 1,968.4 shares of the capital stock of The Toronto Hamilton and Buffalo Railway Company as a 20 per cent stock dividend, making total shares owned 11,810.4.

Acquisition of Capital Stock of The Canada Southern Railway Company

The company acquired during the year 3,501 shares of capital stock of The Canada Southern Railway Company, making its holdings on December 31, 1925, 81,601 shares of 54.4 per cent of the total outstanding.

The Board wishes to express its appreciation of the loyal and efficient service of the officers and employees of the company during the year.

For the Board of Directors,
P. E. CROWLEY,
President.

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Railway Financial News

(*Continued from page* 173)

company for expenditures heretofore made for such purposes. A sinking fund of 5 per cent per annum for 20 years is provided in respect of bonds issued for equipment expenditures."

WHEELING & LAKE ERIE.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell or pledge $2,000,000 of its 5 per cent refunding mortgage bonds, for the purpose of providing funds to be used in retiring $2,000,000 of first mortgage bonds that mature on October 1. It is proposed to sell the bonds at not less than 92 or to pledge them for short term notes to the amount of $1,250,000.

Security Holders Protest Western Rate Decision

The Northwestern Railroad Security Holders Committee has issued a statement through its spokesman, Philip J. Roosevelt, of Roosevelt & Son, intimating that the security holders on the northwestern roads might carry the case to the courts if necessary. The statement is abstracted as follows:

"The presidents and boards of directors of the northwestern railroads have no one to blame but themselves for the denial Friday by the Interstate Commerce Commission of the application for a 5 per cent freight rate increase for all carriers whose lines lie west of the Mississippi River. It was hardly to be hoped that a satisfactory decision would be handed down in view of the position taken by the executives of the northwestern railroads.

"In a letter dated July 1, 1926, to the bondholders and stockholders of the Chicago Great Western, the chairman of the board, S. M. Felton, says 'an emergency increase of 5 per cent, as far as the northwestern roads are concerned, is not half what is necessary to comply with the terms of the transportation act.' Testimony to this effect was given by other executives of other northwestern roads in the western rate case, yet, in spite of this fact, no adequate application to adjust the handicap under which the northwestern roads are operating was filed by the executives of the northwestern roads. In view of the failure of the northwestern carriers' executives to make any special plea for their properties, the commission has seen fit not to grant them any relief at this time.

"The decision of the Interstate Commerce Commission is not without its crumbs of comfort. The commission has accepted 'the results for 1925 as representing the net earning power of western roads for the purposes of this case.'

"In the year 1925 the figures showed the southwestern roads earning 6.30 per cent (more than a 'fair return,' according to the Interstate Commerce Commission definition) on their Interstate Commerce Commission valuations. The security owners' committee, which we organized, disagrees diametrically with the decision of the commission that it is not the duty of the commission to readjust a discriminary situation as is shown to exist in the different parts of the West. Nevertheless, we are not without sympathy for the contention of the commission that 'it is the right and duty of the carriers to take the steps necessary to correct improper rate relations that may be found to exist and to supply revenue deficiencies by initiating suitable changes in rates.' The carriers' executives have utterly failed in their paramount duty to act in this respect. The counsel for the western railroads made no mention of the special conditions prevailing in the Northwest. Every particle of testimony and argument with respect to this question, was brought forward by the committee which we organized.

"We feel that it is the duty of all security holders of the northwestern railroads to bring pressure upon the executives so that they, on their own behalf, will unite to make a proper request for relief to the commission. In the meantime, for the committee's part, we are not going to stop this fight here. We shall consult counsel, and take every means open to us, applying to the courts, if necessary and if practical, to secure relief for the carriers of the Northwest, whose lines lie in Western trunk line territory."

Average Price of Stocks and Bonds

	July 20	Last Week	Last Year
Average price of 20 representative railway stocks	96.36	97.99	81.65
Average price of 20 representative railway bonds	96.67	97.71	90.39

Dividends Declared

International Railways of Central America.—Preferred, 1¼ per cent, payable August 16 to holders of record July 31.

Mine Hill & Schuylkill Haven.—$1.50, payable August 2 to holders of record July 16.

Nashville, Chattanooga & St. Louis.—3½ per cent, semi-annually, payable August 2 to holders of record July 24.

Pullman Company.—$2.00, quarterly, payable August 15 to holders of record July 31.

Valuation Reports

The Interstate Commerce Commission has issued final or tentative valuation reports finding the final value for rate-making purposes of the property, owned and used for common-carrier purposes, as of the respective valuation dates as follows:

FINAL REPORTS		
Pittsburgh & Susquehanna	321,717	1917
Philadelphia & Camden Ferry	2,815,351	1916
TENTATIVE REPORTS		
St. Paul Union Depot	5,944,000	1918

Railway Officers

In the *Railway Age* of July 10, it was incorrectly stated that **T. M. Schumacher,** who was recently appointed chairman of the executive committee of the Western Pacific, had his headquarters at San Francisco, Cal. Mr. Schumacher has his headquarters at New York City.

Executive

A. R. Raymer, chief engineer of the Pittsburgh & Lake Erie and the Lake Erie & Eastern, with headquarters at Pittsburgh, Pa., has been appointed assistant vice-president also, with the same headquarters. Mr. Raymer was born on December 1, 1862, in Canada, and was educated at Toronto University, Toronto, Canada. He entered railway service in 1884 on a road that is now part of the Canadian National and was on location and construction from Gravenhurst to North Bay, Ontario, Canada. From 1886 to 1889, he was on location and construction with the International Railway of Maine (now a part of the Canadian Pacific). During 1889 he was on location on a part of the Canadian National from Waterloo to Elmira, Ontario, Canada, and from 1889 to 1891, he worked for the Louisville & Nashville on the construction of the Cumberland Valley Extension from Cumberland Gap to Big Stone Gap. Mr. Raymer was with the Lake Shore & Michigan Southern (now a part of the New York Central) from 1891 to 1896 at Toledo, Ohio, as assistant engineer on maintenance in charge of office and field surveys. In 1896 he entered the service of the Pittsburgh & Lake Erie as assistant chief engineer, which position he held until March, 1920, when he was appointed chief engineer. This position he will continue to hold in addition to his new duties as assistant vice-president.

A. R. Raymer

Operating

W. A. Shaeffer has been appointed assistant to the superintendent of the Pittsburgh division of the Pennsylvania, with headquarters at Pittsburgh, Pa.

Frank McIntire has been appointed assistant manager of the marine department of the Central of New Jersey, with headquarters at Jersey City, N. J., and with jurisdiction over all sub-departments. The office of superintendent marine department has been abolished.

J. B. Hutchinson, Jr., assistant to the general manager of the Western region of the Pennsylvania, with headquarters at Chicago, has been appointed assistant to the general manager of the Eastern region, with headquarters at Philadelphia, Pa. **W. B. Wood,** formerly superintendent of the New York division, who has been on a leave of absence since September, 1925, on account of injuries received in an automobile accident, has returned to active service and has been appointed assistant to the general manager of the Western region in place of Mr. Hutchinson.

J. D. Bell, superintendent of terminals of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cleve-

land, Ohio, has been appointed superintendent of the newly created Cleveland Terminal district of that road and of the New York Central, with the same headquarters. **G. H. Jedele,** assistant division superintendent on the New York Central, with headquarters at Cleveland, has been made assistant superintendent of the Cleveland Terminal district, with the same headquarters. **E. W. Lossee, E. G. Wright** and **H. C. Van Bergen** have been appointed trainmasters of the Cleveland Terminal district, with headquarters at Cleveland.

R. W. Rogers, who has been appointed superintendent of the Georgia division of the Seaboard Air Line, with headquarters at Atlanta, Ga., was born on December 4, 1887, at Culoden, Ga., and received a high school education. He entered railway service with the Atlanta & West Point on July 1, 1907, as a bookkeeper in the auditor's office, and on March 1, 1908, he went with the Seaboard Airl Line as a file and voucher clerk at Abbeville, S. C. On December 1 of that year he became roadway clerk at Monroe, N. C., and on October 1, 1909, was promoted to chief clerk to the division engineer at Atlanta, Ga. He became chief clerk to the superintendent in that place on March 1, 1910, and trainmaster there on March 1, 1924, which position he was holding at that time of his recent appointment as superintendent of the Georgia division.

H. E. Roll, trainmaster on the Little Rock division of the Missouri Pacific, with headquarters at McGehee, Ark., has been promoted to assistant superintendent of the Louisiana division, with headquarters at Eldorado, Ark., succeeding **J. T. Watson,** who has been appointed trainmaster on the Illinois division, with headquarters at Illmo, Mo. **E. E. Buckminister,** trainmaster on the Illinois division, has been transferred to the Little Rock division in place of Mr. Roll. **C. A. Forbes,** trainmaster on all districts of the Central division, with headquarters at Van Buren, Ark., has been given jurisdiction over the Van Buren, Altus and Clarksville districts of the same division, with the same headquarters, succeeding **F. W. Kidd,** deceased. **R. L. Hardgraves,** trainmaster on the White River division, with headquarters at Cotter, Ark., has been transferred to the Central division in place of Mr. Forbes. **W. A. Anderson,** trainmaster on the Arkansas division, with headquarters at Little Rock, Ark., has been transferred to the White River division, succeeding Mr. Hardgraves. **C. W. Spruell** has been appointed trainmaster on the Arkansas division in place of Mr. Anderson.

Traffic

A. H. Murphy has been appointed general agent for the Chicago, Milwaukee & St. Paul, with headquarters at Philadelphia, Pa., succeeding **George J. Lincoln,** who has been assigned to other duties.

W. H. Donny, assistant general passenger agent of the Missouri Pacific, with headquarters at Kansas City, Mo., has resigned to enter the sales department of the American Bond & Mortgage Company at New York.

H. L. Hollister has been appointed traffic manager of the Wichita Falls & Southern, with headquarters at Wichita Falls, Tex., succeeding **H. N. Roberts,** resigned, and **Glenn Thompson** has been appointed general agent, with headquarters at Breckenridge, Tex.

C. L. Netherland, assistant general freight agent of the Illinois Central, with headquarters at Memphis, Tenn., has been appointed assistant general freight agent in charge of solicitation, with the same headquarters, succeeding **W. B. Ryan,** who has resigned to become traffic manager of the E. L. Bruce Lumber Company, Memphis. **R. W. Quindley** has been appointed assistant general freight agent in place of Mr. Netherland.

The report of the changes in the traffic department officers of the Southern Pacific, which appeared in the *Railway Age* of July 10, page 79, was erroneous in stating that **F. H. Plaisted,** who has been promoted to freight traffic manager, with headquarters at Chicago, succeeded the late **G. W. Luce.** Mr. Luce has been succeeded by **J. T. Saunders,** formerly assistant freight traffic manager, with headquarters at Los Angeles, who has been promoted to freight traffic manager, with headquarters at San Francisco, Cal.

Mechanical

M. D. Stewart has been appointed superintendent of motive power, Lines West, of the Southern, with headquarters at Cincinnati, Ohio, and **J. M. Plaskitt** has been appointed assistant to the superintendent of motive power, Lines West, with the same headquarters. **Frank Johnson** has been appointed master mechanic at Princeton, Ind., **W. B. Bunn,** master mechanic at Chattanooga, Tenn., **J. A. Wilking,** master mechanic at Ludlow, Ky., **L. C. Shults,** master mechanic at Somerset, Ky., **H. E. Dyke,** master mechanic at Selma, Ala., **T. E. Gary,** master mechanic at Sheffield, Ala., and **J. C. Cain** has been appointed assistant master mechanic at Birmingham, Ala. **J. B. Michael,** master mechanic at Selma, Ala., and **W. H. Dooley,** master mechanic at Ludlow, Ky., have been assigned to other duties.

Special

M. E. Bernet, general publicity manager of the Southwestern Bell Telephone Company, has been appointed general advertising agent of the Wabash, with headquarters at St. Louis, Mo.

Obituary

G. W. Becker, assistant general freight agent of the Illinois Central, with headquarters at Chicago, died in the Illinois Central hospital in that city on July 18.

R. R. Seeds, general agent, freight department, of the Chicago, Rock Island & Pacific, with headquarters at Phoenix, Ariz., died in that city on July 11.

T. E. Clarke, former general superintendent of the Delaware, Lackawanna & Western, died in Scranton, Pa., on July 15. Before entering the service of the Delaware, Lackawanna & Western, Mr. Clarke was connected in official capacity with several Middle Western systems.

S. B. Fisher, consulting engineer of the Missouri-Kansas-Texas Lines, died at the M-K-T hospital in Parsons, Kan., on July 9. Mr. Fisher was born on October 24, 1846, at Cherry Fork, Ohio, and was educated at Washington and Jefferson college, Washington, Pa., from which college he received the degrees of Bachelor of Science, Master of Science and Doctor of Science. He entered railway service with the Pennsylvania at Pittsburgh in 1873 as assistant engineer. Mr. Fisher remained with that company until 1885, when he was appointed chief engineer of the Milwaukee & Northern (now a part of the Chicago, Milwaukee & St. Paul), at Green Bay, Wis., and in 1890 was appointed chief engineer of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn. In 1892 he was appointed chief engineer of the Everett & Monte Cristo (now a part of the Northern Pacific), with headquarters at Everett, Wash. On June 1, 1895, he entered the service of the Missouri-Kansas-Texas to take charge of the construction of what is now known as the Holden division, and on December 1 of that year he was appointed assistant chief engineer, still retaining supervision of the Holden division construction work. He was appointed chief engineer in May of the following year, which position he held until 1912, when there was a change in the organization of the Missouri-Kansas-Texas, under which new organization Mr. Fisher became chief engineer of construction. In March, 1913, when the Valuation Act became a law, he became chairman of the valuation committee, and on March 1, 1916, was appointed consulting engineer, which position he was holding at the time of his death.

THE SEVENTEENTH ANNUAL PICNIC of the Colorado & Southern employees was held at Idaho Springs, Colo., on June 26. Athletic contests of all kinds were held and prizes were awarded the winners.